

# Medium Voltage Controllers Bulletin 1512A 800A One-High Cabinet Standard and Arc Resistant Enclosure

Catalog Numbers 1512A, 1512AT, 1512DM, 1512M



## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.



**IMPORTANT** Identifies information that is critical for successful application and understanding of the product.

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Labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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### **New and Updated Information**

This manual contains new and updated information.

This table contains the changes that are made to this revision.

| <b>Topic</b>   | <b>Page</b>               |
|--|---------------------------|
| Changed description for 1512DM and 1512M Bulletin Numbers  | <a href="#">9</a>         |
| Modified figure Typical Structure Nameplate.   | <a href="#">10</a>        |
| Modified figure Typical Unit Nameplate.  | <a href="#">10</a>        |
| Modified figure Access to Power Bus from Side and Rear Cabinet Typical.  | <a href="#">16</a>        |
| Modified information in Figure 14 for current transformer.   | <a href="#">20</a>        |
| Modified figure Access to Low Voltage Compartments, Arc Resistant.   | <a href="#">23</a>        |
| Added steps to Opening the Medium Voltage Door.  | <a href="#">24</a>        |
| Added All MV doors must be securely bolted closed before the ArcShield latch handles are rotated.  | <a href="#">25</a>        |
| Added Important table.   | <a href="#">26</a>        |
| Added Important table.   | <a href="#">27</a>        |
| Added figures Low Voltage Panel, Access to Power Bus with Low Voltage Panel Rotated, Removal Of Access Panel with Low Voltage panel Rotated, Removal of Low Voltage Barriers, and Power Bus with Bottom Access Barrier Removed.  | <a href="#">30 ... 32</a> |
| Modified Access Power Bus Front Access - Top Entry procedure.  | <a href="#">30</a>        |
| Added Typical Ground Bus Splicing Configuration (Front View) illustration.   | <a href="#">37</a>        |
| Modified Important table.  | <a href="#">43</a>        |
| Added Attention table.   | <a href="#">44</a>        |
| Modified figures Door Interlock Lever, Inspecting Isolation Switch in Open position, Contactor Voltage Checkpoints, Isolation Switch Voltage, Removing the Contactor Front View), Closing Contactor Manually (some parts not shown), Isolation Switch Lubrication Points, Isolation Switch Grounding Adjustment, Location of I <sub>a</sub> and I <sub>b</sub> Auxiliary Contacts, Adjusting Auxiliary Contacts (I <sub>a</sub> Auxiliary Contacts shown). | <a href="#">44 ... 57</a> |
| Added part numbers 80178-750-51, 80158-147-52, PN-272006.  | <a href="#">61</a>        |
| Increased the unit quantity of PN-272006   | <a href="#">61</a>        |
| Added 50 kA to ArcShield™ Unit Information.  | <a href="#">63</a>        |
| Added Attention and Warning Tables.  | <a href="#">73</a>        |
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**ArcShield™ Chimney Installation  
Instructions**

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**Notes:**

## General Information

### Scope

This document pertains to the Rockwell Automation® Bulletin 1512A medium voltage (MV) controller. The Bulletin 1512A structure provides one complete MV controller unit.

The product Bulletin numbers that are covered by this document are:

- 1512A      800A      FVNR controller
- 1512AT      800A      Transformer Feeder

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**IMPORTANT** This document is used for all Bulletin 800 and 1512A unit types, including arc resistant (ArcShield™) units. Important information specifically for ArcShield units can be found in Appendix A, B, and C.

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**ATTENTION:** See the information in Appendix A, B, and C to install and maintain ArcShield arc resistant units. Failure to do so can negate the arc resistant benefits that are provided by ArcShield, which exposes personnel to risk of serious injury or death.

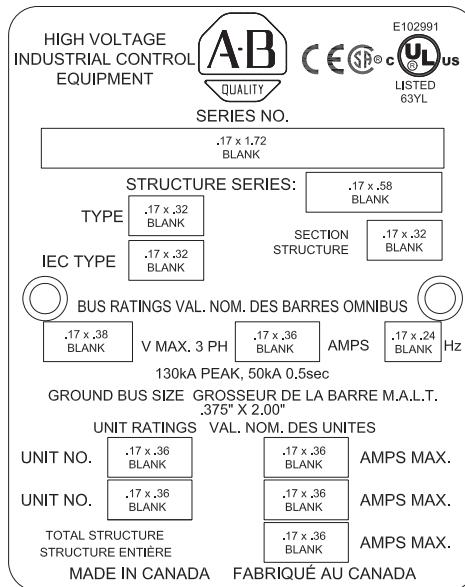
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This document can also be used as a reference guide for these Bulletin numbers:

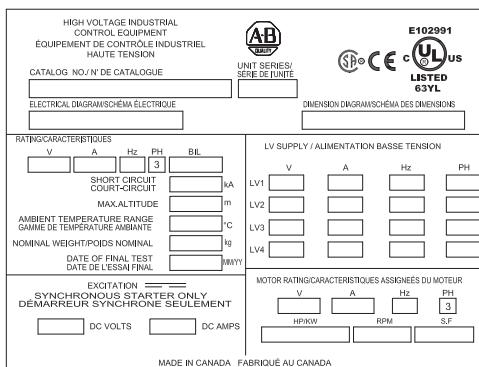
- 1512DM      800A      (FVIO) Input Contactor with Output Isolator
- 1512M      800A      (FVOP) Output Bypass Controller

### Starter Identification

A nameplate is attached to the right-side flange of the structure ([Figure 1](#)). See the nameplate for information such as series number, section number, NEMA (National Electrical Manufacturers Association) enclosure type, unit ratings, and bus ratings.

**Figure 1 - Typical Structure Nameplate**

A nameplate is also found in the low voltage compartment (see [Figure 2](#)) with unit motor application information.

**Figure 2 - Typical Unit Nameplate**

Refer to these nameplates whenever you contact Rockwell Automation for assistance. Be prepared to provide such information as series number, structure series, unit series, diagram schematic, and catalog number.

## Recommended Torque Values

When you are installing components, or when assembling the cabinet, tighten these bolt sizes to the specified torque values.

**Table 1 - Torque Values**

|                   |                   |
|-------------------|-------------------|
| 1/4 in. Hardware  | 6 lb•ft (8 N•m)   |
| 5/16 in. Hardware | 12 lb•ft (15 N•m) |
| 3/8 in. Hardware  | 20 lb•ft (27 N•m) |
| 1/2 in. Hardware  | 48 lb•ft (65 N•m) |

## Installation - Standard Enclosure (Not Arc Resistant)

**IMPORTANT** For installation of ArcShield™ arc resistant equipment, refer to [Chapter 3](#).

**IMPORTANT** For information on the installation site preparation, see General Handling Procedures for MV Products, Publication [MV-QS050 -EN-P](#).



**ATTENTION:** Use personal protective equipment (PPE) per local codes or regulations. Failure to do so can result in severe burns, injury, or death.

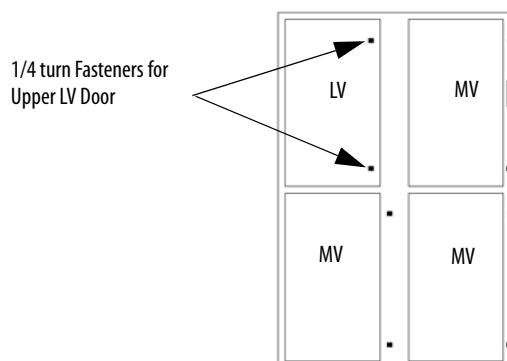
### Door Opening Procedure

### Opening the Low Voltage Doors

Low voltage door is identified as LV in [Figure 3](#).

1. To access the low voltage compartment, use a flat-head screwdriver to turn both 1/4-turn fasteners on the low voltage door, counterclockwise 90°. See [Figure 3](#).
2. The door is now released and swings open.
3. To secure the door, reverse the procedure.

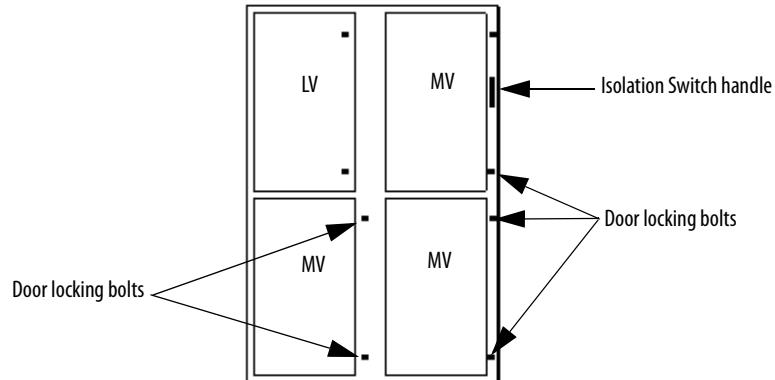
**Figure 3 - Access to Low Voltage Compartments, Standard Enclosure**



## Opening the Medium Voltage Doors

Medium voltage (MV) doors are identified in [Figure 4](#).

**Figure 4 - Access to Medium Voltage Compartments, Standard Enclosure**



The MV door has its own isolation switch handle and the interlocking safeguards.

See [Access to the Power Bus on page 15](#), for the procedure to open the swing-out low voltage (LV) panel behind the low voltage (LV) door (for standard cabinet only).

1. Press the STOP button on the starter or at the remote control location.  
Both open the contactor electrically.
2. Move the isolation switch handle to the OFF position.
3. Unscrew the door locking-bolts for the upper right-hand MV door.  
The door is now released.
4. Open the upper right-hand MV door by swinging it open.
5. Pull the interlock release lever forward. The Interlock release lever is at the bottom right corner of the door opening.

**IMPORTANT** The Bottom MV doors cannot be opened until the interlock release lever is pulled forward.

6. Open the bottom right-hand door by unscrewing the locking bolts.
7. Unbolt and open the bottom left door.
8. Close the doors by reversing the procedure.

**IMPORTANT** Verify that the swing-out low voltage panel is in its original position before attempting to close the medium voltage (MV) door. When closing the MV doors, verify all door locking-bolts on the right side of the MV door are in place. Tightened the bolts until the door is even with the flange. Do not over tighten the bolts. If the door is not securely fastened, the isolation switch handle cannot be moved to the ON position.



**ATTENTION:** Complete the [Power Lockout Procedure on page 45](#) before beginning any service procedures to the unit. Failure to do so can result in severe burns, injury, or death.

## Anchoring

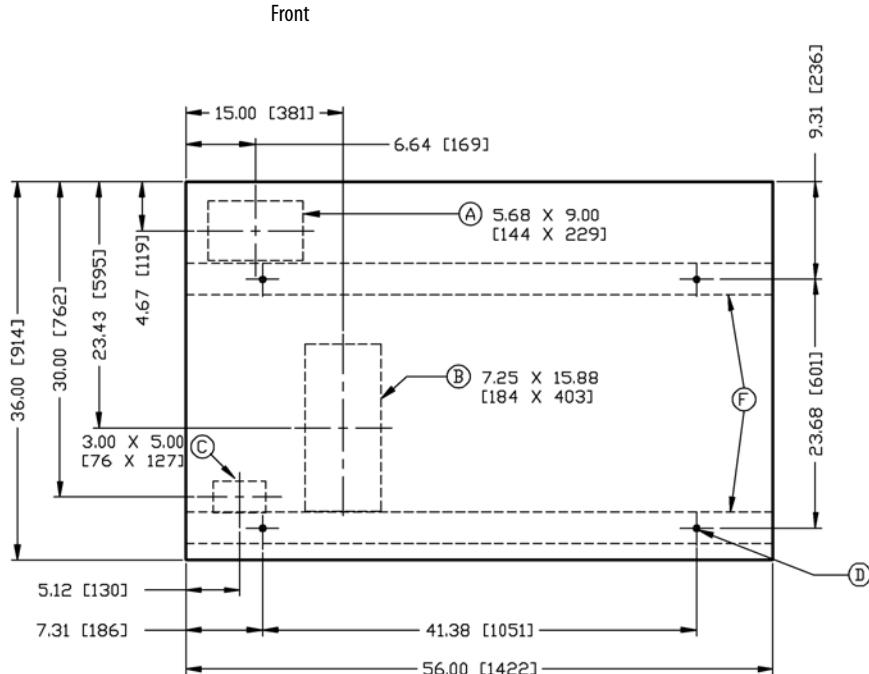
Place the controller in the required installation location. Use M12 (1/2 in.) floor mounting-bolts to fasten the controller to the mounting surface. See [Figure 5](#) as an example of the location of the mounting holes in the cabinet.

**IMPORTANT** See the Dimension Drawing for additional details that are related to the cabinet floor plan.

**IMPORTANT** Pre-determined cabinets are designed for Uniform Building Code (UBC) seismic zone 1, 2A, 2B, 3, 4, and IBC (International Building Code) seismic activity without overturning or lateral movement. Provided they are securely mounted according to UBC, IBC, and the local building codes. This restriction can include concrete pad design, steel floor design and the sizing of cabinet anchors. Concrete floor cutouts must not be next to floor anchor bolts and must be sized to seismic load. If an accredited engineer must review the floor mounting, consult the factory. Many jurisdictions require an engineer from the local area to review the design. Seismic qualification does not indicate that the equipment will function properly after a seismic event.

**Figure 5 - Cabinet Floor Plan**

- Ⓐ Line Cable Conduit opening.
- Ⓑ Load Cable Conduit opening.
- Ⓒ Control Wire Conduit opening.
- Ⓓ Mounting Holes for M12 (1/2 in.) Diameter Anchor Bolts.
- Ⓔ Removable Lifting Angle (2).
- Ⓕ 1.00 [25] X 3.00 [76] Non-removable Sill Channels.



**IMPORTANT FOR SEISMIC APPLICATIONS**

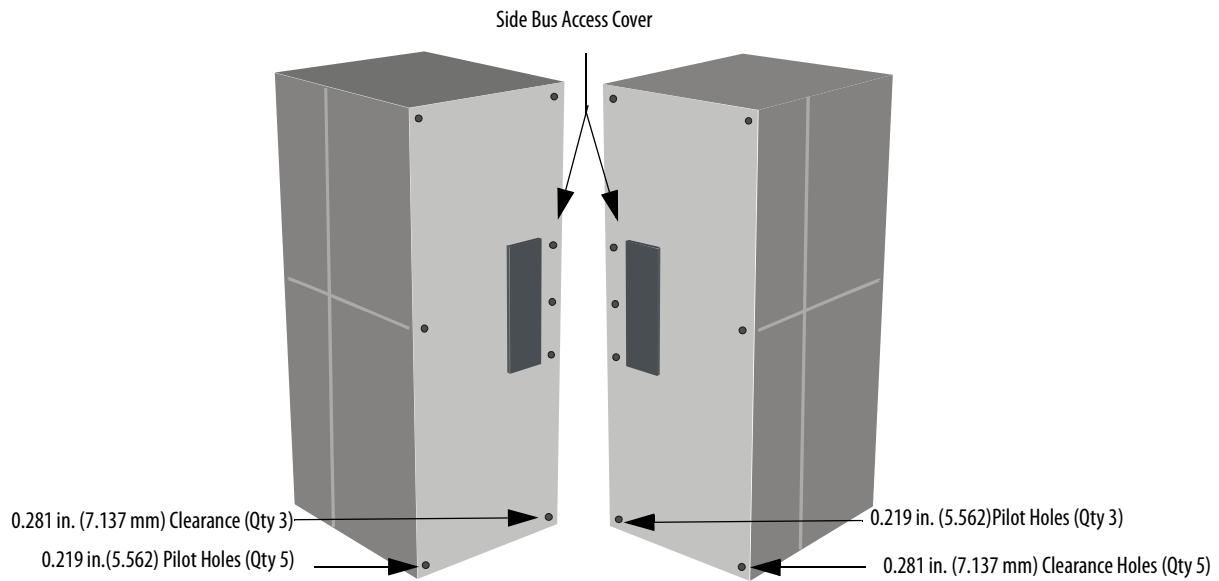
For installations on concrete – the minimum depth and radius of concrete that supports the cabinet anchors is dependent on seismic loads. See [Anchoring on page 13](#) for important information.

For installations on a metal structure – the metal plate depth and the method to anchor the cabinet is dependent on seismic loads.

## Joining the Sections

**IMPORTANT** The joining hardware can be found in a package mounted to the front of the shipping skid. See Publication [MV-QS050 -EN-P](#) requirements for a level floor surface.

1. Position the left side section on a level surface and secure the section in place with M12 (1/2 in.) Floor mounting-bolts (see [Anchoring on page 13](#)).
2. When joining NEMA/EEMAC Type 12 sections, apply a continuous 3 mm (0.125 in.) bead of silicon around the perimeter of one section.
3. Remove the side bus access covers, if applicable.
4. Position the right section against the left section. Make sure that the surface is level.
5. Secure the sections together with 0.25 - 20 self-tapping screws. Thread the screw through the 0.281 in. clearance hole to the corresponding 0.219 in. pilot hole. To access the front clearance holes of the left-side cabinet, open the medium voltage (MV) doors. To access the rear clearance holes, remove the rear covers of the starter. If rear access is not available, refer to [Front Access – Top Incoming Load Cables on page 17](#) or [Front Access – Bottom Incoming Line Cables on page 19](#).
6. Secure the right section to the floor using ½ in. (M12) floor mounting-bolts (see [Anchoring on page 13](#)).

**Figure 6 - Joining the Sections**

## Access to the Power Bus

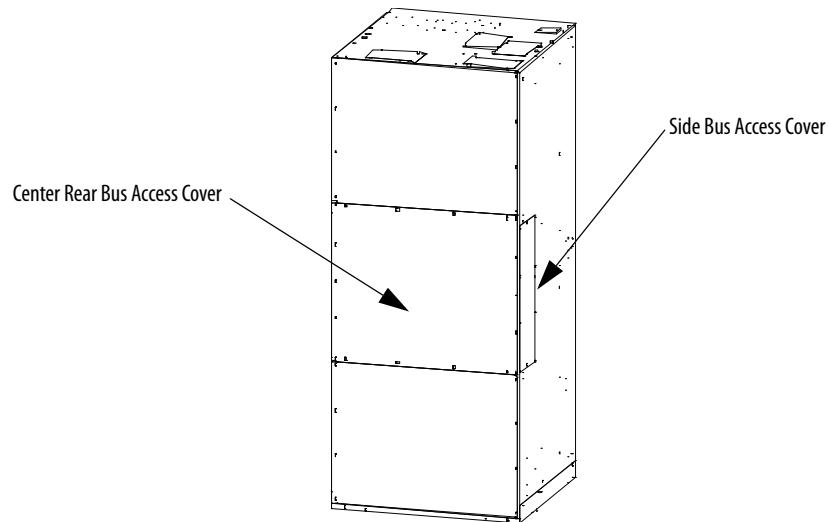


**ATTENTION:** This procedure requires contact with medium voltage (MV) components. To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#). Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

### Rear Access

1. Remove the hardware that secures the center rear bus access-cover ([Figure 7](#)).
2. Remove the center rear bus access-cover.
3. When the rear bus cover is removed, you see the three power bus bars and grounding bus ([Figure 8](#)).

**Figure 7 - Access to Power Bus From Side and Rear Cabinet, typical**



**Figure 8 - Bus Bars from Back Access**



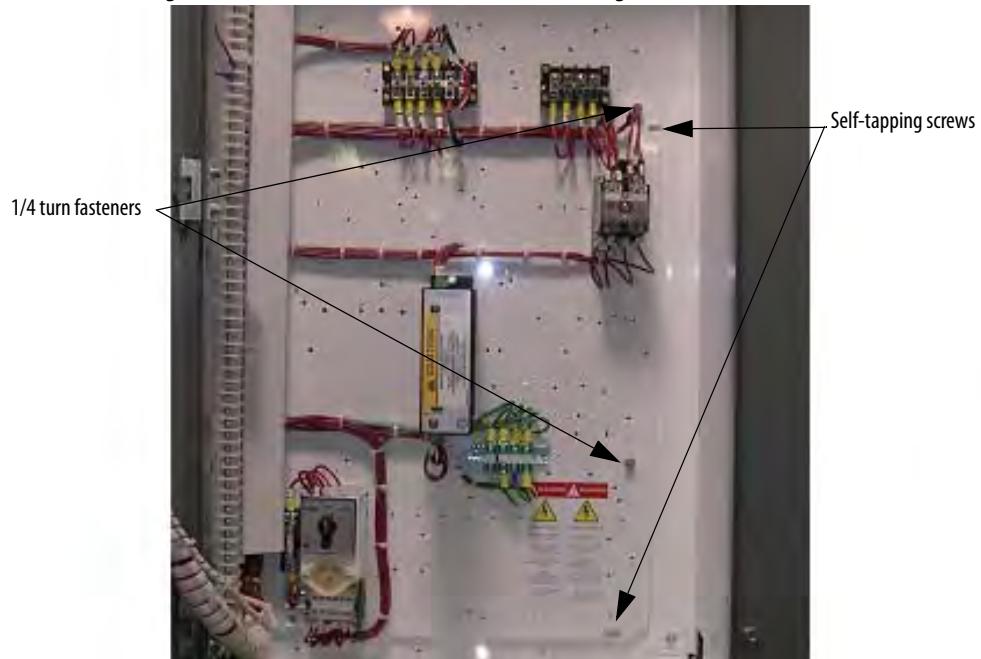
## **Side Access**

A side bus access cover is on each side of the controller.

1. Remove the hardware from the appropriate side bus access cover.
2. Remove the side bus access cover.
3. When the side bus access cover is removed, you see the three power bus bars and grounding bus ([Figure 9](#)).

**Figure 9 - Side Bus Access Cover Removed****Front Access – Top Incoming Load Cables**

1. Complete the [Power Lockout Procedure on page 45](#) for medium-voltage power cells and the power bus.
2. Open the low-voltage cell door (see [page 11](#)).
3. Open the medium-voltage cell doors (see [page 12](#)).
4. Remove the self-tapping screws from the low voltage panel if installed.  
Installed for shipment purposes – [Figure 10](#).

**Figure 10 - Removal of Access Panel with Low Voltage Panel Rotated.**

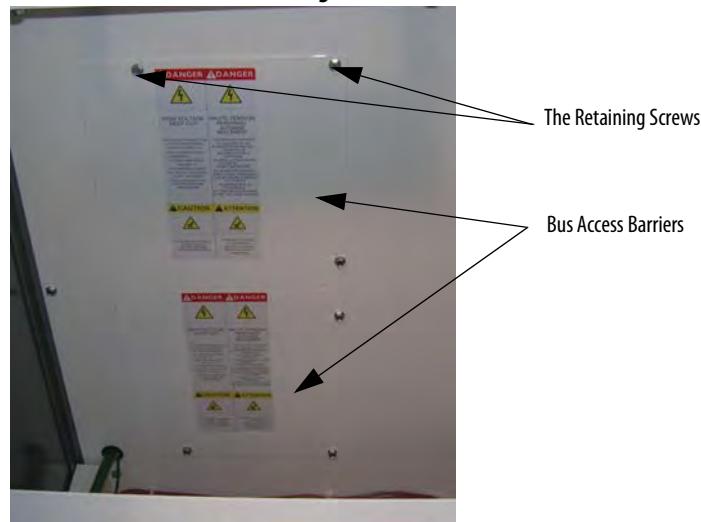
5. Use a flat head screwdriver to turn the 1/4 turn fasteners counterclockwise 180°.

6. Pull on right-hand side of low voltage panel. Swing the low voltage panel to the front and left of cabinet (see [Figure 12](#)).

**IMPORTANT** Before the low voltage panel is rotated, the power cell door must be in a fully opened position.

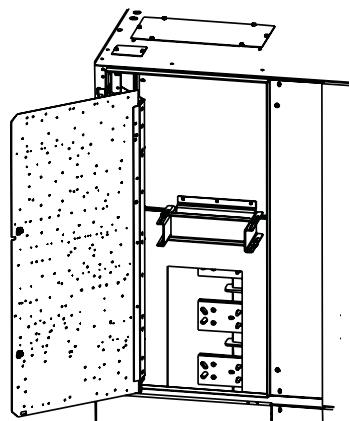
7. Locate the removable bus access barriers.

**Figure 11 - Access to Power Bus with Low Voltage Panel Rotated**



8. Remove the retaining screws from removable bus access barrier. The incoming cable connections to main bus are exposed (see [Figure 12](#)).

**Figure 12 - Power Bus with Barrier Removed**



9. Install the incoming line cables to power bus. Torque to recommended values on [page 10](#).
10. Reverse procedure after cables are installed.



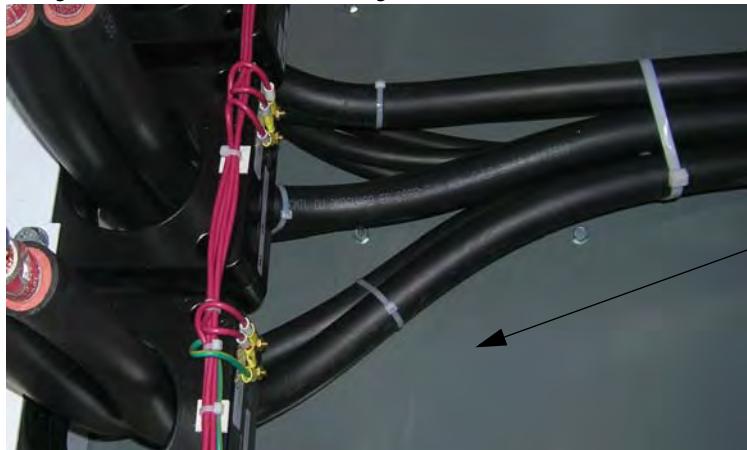
**ATTENTION:** Make sure that all barriers are installed before re-energizing the equipment. Failure to do so can result in electrical faults, damage equipment, or severe injury to personnel.

## Front Access – Bottom Incoming Line Cables

If the incoming cables in your cabinet enter the section from the bottom, follow the same procedure as for [Front Access – Top Incoming Load Cables on page 17](#).

1. Open all power cell doors.
2. Locate incoming cable duct at rear left-hand side of power cell (see [Figure 13](#)).
3. Remove self-tapping screws from the cable duct access-barriers. Remove barriers.
4. Route and install incoming line cables up to power bus. Torque to the recommended values specified on [page 10](#).
5. Reverse procedure after cables are installed.

**Figure 13 - Access to Bottom Incoming Cables**



Bottom cable opening  
(top exit cables  
configuration shown)



**ATTENTION:** Make sure that all barriers are installed before re-energizing the equipment. Failure to do so can result in electrical faults, damage equipment, or severe injury to personnel.

## Load Cable Connections



**ATTENTION:** To avoid shock hazards and lockout incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

**IMPORTANT**

The current transformers can be positioned for top or bottom cable exit. Follow the appropriate procedure that is described for your starter configuration.

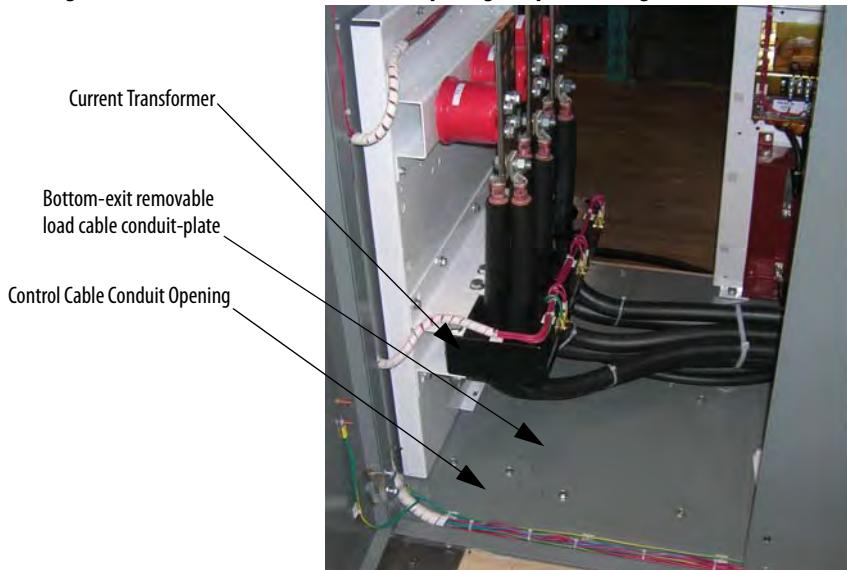
**IMPORTANT**

Cable size cannot exceed 1-1000 MCM, 2-750 MCM, 3-500MCM, or 4-500 MCM per phase.

**IMPORTANT** See Dimensional Drawings that are provided with order documentation for additional details that are related to cabinet floor plan.

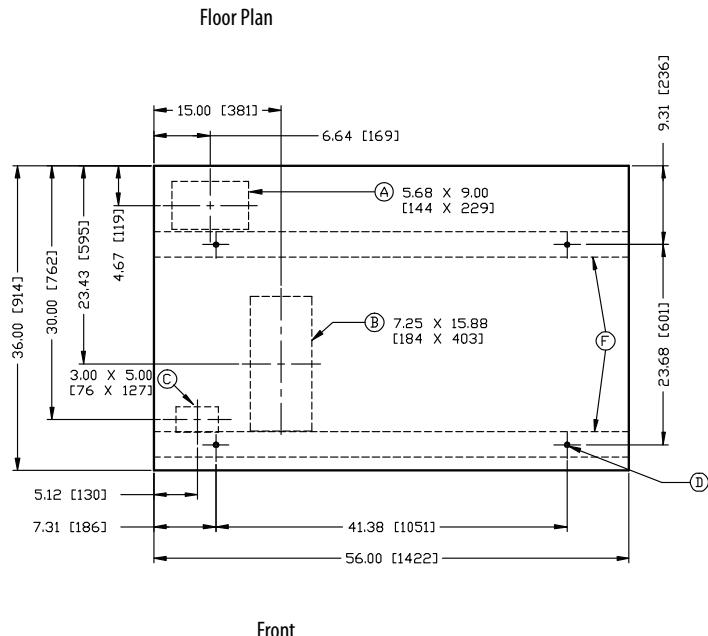
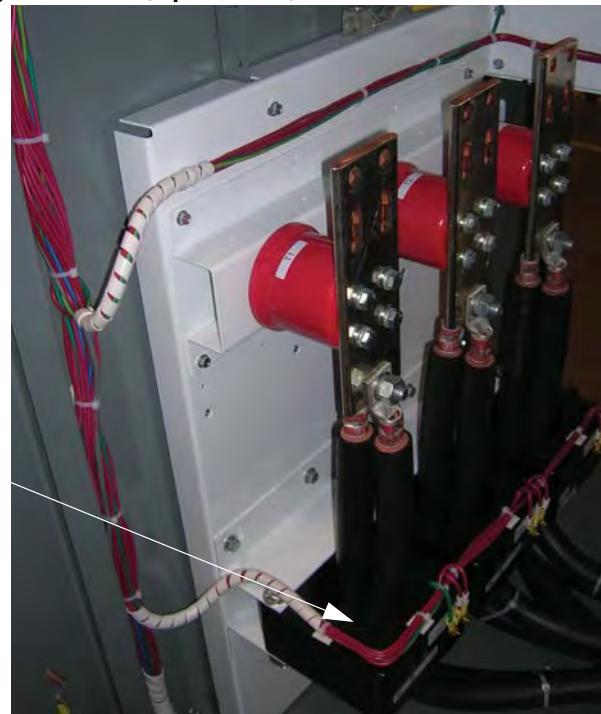
1. Complete the [Power Lockout Procedure on page 45](#).
2. Remove the appropriate cable conduit-opening plate from the cabinet (see [Figure 14](#)...[Figure 17](#)). The plate can be punched or cut to mount conduit.
3. Route load cables for the power cell before control cables. Pull the cables into the cabinet through the appropriate opening (see [Figure 14](#)...[Figure 17](#)).
4. Connect the cables to the current transformers and tighten the connections to 48 lb•ft (65 N•m).
5. Connect cable shields (if present) to the Ground lug.
6. Reinstall the current transformer barrier and reassemble the cabinet.

**Figure 14 - Access to Load Cable Conduit Openings (Top Exit Configuration Shown)**



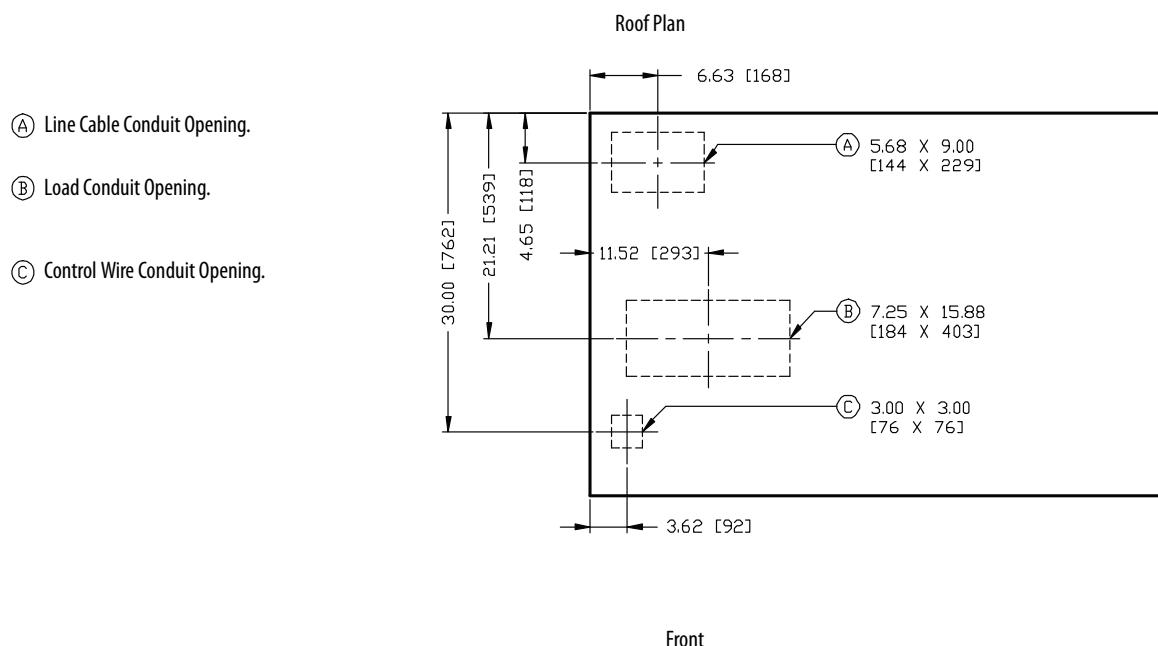
**Figure 15 - Load Cable Conduit Openings, Bottom Exit**

- Ⓐ Line Cable Conduit Opening.
- Ⓑ Load Cable Conduit Opening.
- Ⓒ Control Wire Conduit Opening.
- Ⓓ Mounting Holes for M12 (1/2 in.)Diameter Anchor Bolts.
- Ⓔ Removable handleLifting Angles (2).
- Ⓕ 1.00 [25] x 3.00 [76] Non-removable Sill Channels.

**Figure 16 - Routing of Load Cables (Top exit shown)**

**ATTENTION:** Install all barriers before re-energizing the equipment. Failure to do so can result in electrical faults and damage equipment or severe injury to personnel.

**Figure 17 - Load Cable Conduit Openings, Top Exit**



## Installation – Arc Resistant Enclosure (ArcShield™)

This installation section contains information on the Rockwell Automation® “ArcShield™” arc resistant enclosure.

**IMPORTANT** For information on the installation site preparation, see General Handling Procedures for MV Products, Publication [MV-QS050](#). The levelness of floors must meet the levelness specification that is outlined in this document.



**ATTENTION:** Use suitable personal protective equipment (PPE) per local codes or regulations. Failure to do so can result in severe burns, injury, or death.

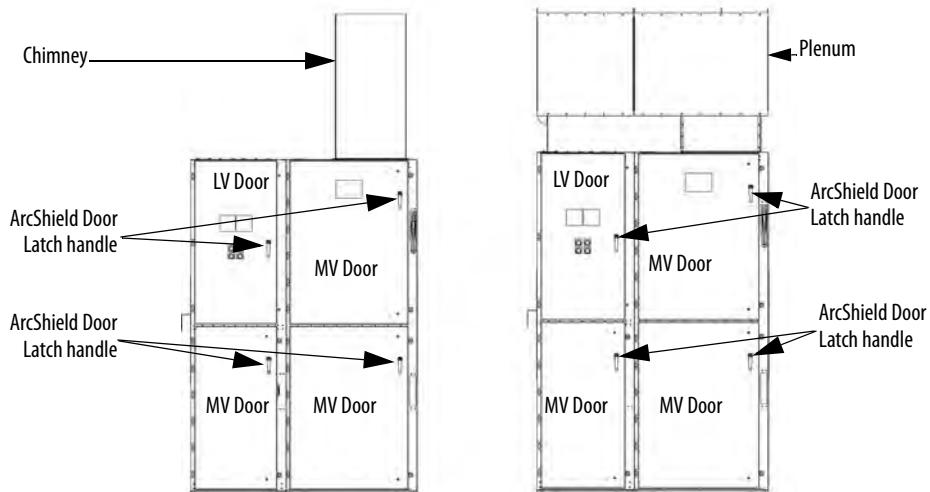
### Door Opening Procedure

### Opening the Low Voltage Doors

Low voltage doors are identified as LV in [Figure 18 on page 23](#).

1. To access the low voltage control compartments for ArcShield cabinets, turn the black release handle counter-clockwise 90° (to a 3 o'clock position).
2. The low voltage compartment door is now released and swings open.
3. To secure the low voltage compartment doors, reverse the procedure.

**Figure 18 - Access to Low Voltage Compartments, Arc Resistant**





**ATTENTION:** Complete the [Power Lockout Procedure on page 45](#) before beginning any service procedures to the unit. Failure to do so can result in severe burns, injury, or death.

## Opening the Medium Voltage Doors

**IMPORTANT** All medium voltage doors are interlocked to the isolation switch handle. The low voltage panel compartment and power cell are separated by an isolation barrier.

The Medium Voltage (MV) doors are identified as MV in [Figure 18 on page 23](#).

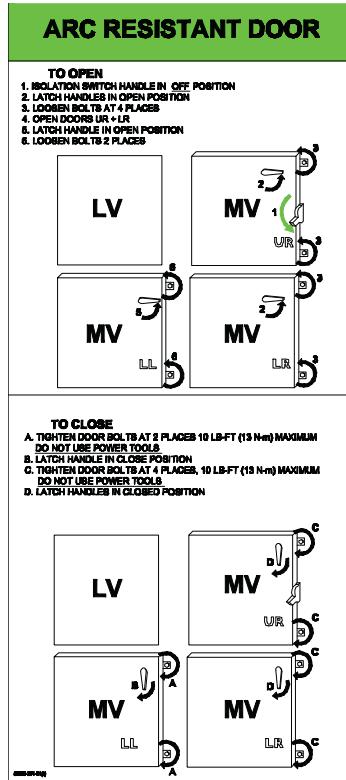
**IMPORTANT** Failure to follow the procedure for Opening the Medium Voltage Door could damage or jam the mechanical door interlocks. Damage or a jam could result in the mechanical interlocks not operating as intended and could result in the door becoming jammed in the closed position.

**IMPORTANT** On all ArcShield starters, the sticker that is shown in [Figure 19](#) is attached to each door for your reference.

1. Press the STOP button on the starter or at the remote control location.
2. Move the isolation switch handle to the OFF position.
3. Turn the black release handle for the upper right-hand MV door, counter-clockwise 90°(to a 3 o'clock position). Only rotate the arc latching handle when the door locking bolts are tightened (see [Figure 19](#)). The arc latching-mechanism can be damaged by forcing the arc latching handle.
4. Unbolt the door locking bolts for the upper right-hand MV door.
5. Swing open the door that is now released.
6. Turn the black release handle, for the lower right-hand MV door, counter-clockwise 90°(to a 3 o'clock position).
7. Unbolt the lower right-hand MV door locking bolts.
8. Swing open the door that is now released.
9. Turn the black release handle, for the lower left-hand MV door, counter-clockwise 90°(to a 3 o'clock position).
10. Unbolt the lower left-hand MV door locking bolts.
11. Swing open the door that is now released.
12. To close the doors, reverse the procedure. Tighten door-lock bolts to the recommended torque values on [page 10](#).

13. Verify all six door locking bolts, on the right-hand side of the MV doors, are in place and tightened to their maximum torque value. DO NOT CROSTHREADD OR OVER TIGHTEN.
14. Turn all black release handles counterclockwise 90°(to a 3 o'clock position). Failure to place the black handles in this position render the cabinet arc resistant capabilities ineffective. See [Figure 19 on page 25](#).

**Figure 19 - Label on Arc Resistant Door**



**ATTENTION:** Do not over tighten the bolts.

The top right MV door must be securely fastened for the isolation switch handle to move to the ON position. All MV doors must be securely bolted closed before the ArcShield latch handles are rotated.

Only rotate the arc latching handle when the locking bolts are tightened (refer to [Figure 19](#)). The arc latching mechanism can be damaged by forcing the arc latching handle.



**ATTENTION:** Complete the [Power Lockout Procedure on page 45](#) before beginning any service procedures to the unit. Failure to do so can result in severe burns, injury, or death.

## Anchoring

Place the controller in the required installation location. Fasten the controller to the mounting surface by using floor mounting bolts M12 (1/2in.). See [Figure 20](#) as an example of the location of the mounting holes in the cabinet.

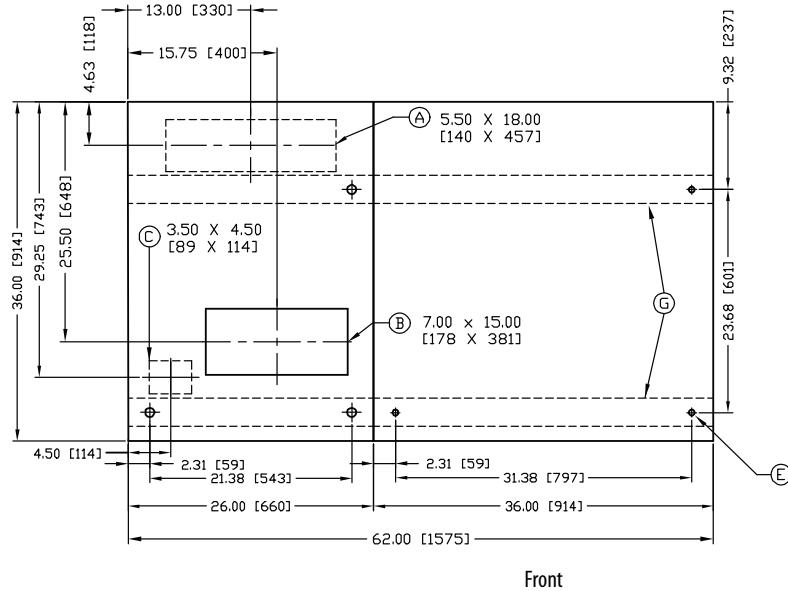
**IMPORTANT** All mounting holes must be used to seal the cabinet. Failure to use or fill all mounting holes with hardware result in an unplanned release of arc gases.

**IMPORTANT** See Dimension Drawing provided with order documentation for additional details that are related to cabinet floor plan.

**IMPORTANT** Pre-determined cabinets are designed for Uniform Building Code (UBC) seismic zone 1, 2A, 2B, 3, and 4, and IBC (International Building Code) seismic activity without overturning or lateral movement. Provided they are securely mounted according to UBC, IBC, and the local building codes. Mounting can include concrete pad design, steel floor design and the sizing of cabinet anchors. Concrete floor cutouts must not be next to floor anchor bolts and must be sized to seismic load. If an accredited engineer must review the floor mounting, consult the factory. Many jurisdictions require an engineer from the local area to review the design. Seismic qualification does not indicate that the equipment will function properly after a seismic event.

**Figure 20 - Cabinet Floor Plan – Top Entry/Exit Units, Arc Resistant Cabinet**

- Ⓐ Line Cable Conduit Opening.
- Ⓑ Load Cable Conduit Opening.
- Ⓒ Control Wire Conduit Opening.
- Ⓓ Plenum is removed and shipped separately.  
Customer must install.
- Ⓔ Mounting Holes for M12 (1/2 in.) Diameter Anchor Bolts.
- Ⓕ Removable Lifting Angles.
- Ⓖ 1.00 [25] x 30 [76] Non-removable Sill Channels.



**IMPORTANT** The joining hardware can be found in a package mounted to the front of the shipping skid. See Publication [MV-QS050 -EN-P](#) for level floor surface requirements.

1. Remove the side bus access covers if applicable.

2. Position the left side section on a level surface and secure the section in place using floor mounting bolts M12 (1/2 in.). See [Anchoring on page 26](#).
3. When joining ArcShield sections, apply a continuous 3 mm (0.1250 in.) wide bead of silicon sealer around the entire outer perimeter of one section.
4. Apply a continuous 3 mm (0.1250 in.) wide bead of silicon sealer around the cutout for the power bus.
5. Position the right section against the left section. Make sure that the surface is level.
6. Secure the sections together with the 0.250in. 20 self-tapping screws. Thread the screw through the 0.281 in. clearance hole to the corresponding 0.219 in. pilot hole. To access the front clearance holes of the left-side cabinet, open the medium voltage doors. Access the rear clearance holes by removing the rear covers of the starter. If rear access is not available, refer to [Front Access – Top Entry on page 30](#).
7. Secure the entire perimeter of the horizontal bus. Use the provided 0.250in. 20 thread fasteners. Make sure that there is a continuous bead of silicone seal around the bus bar opening on one cabinet.
8. Secure the right section to the floor by using floor mounting bolts M12 (1/2 in.). See [Anchoring on page 26](#).

---

**IMPORTANT** ArcShield units at the end of a line-up have a ground connection to the outside side bus access-cover (see [Figure 23](#) and [Figure 24](#)). This connection must be maintained for unit arc resistant performance.

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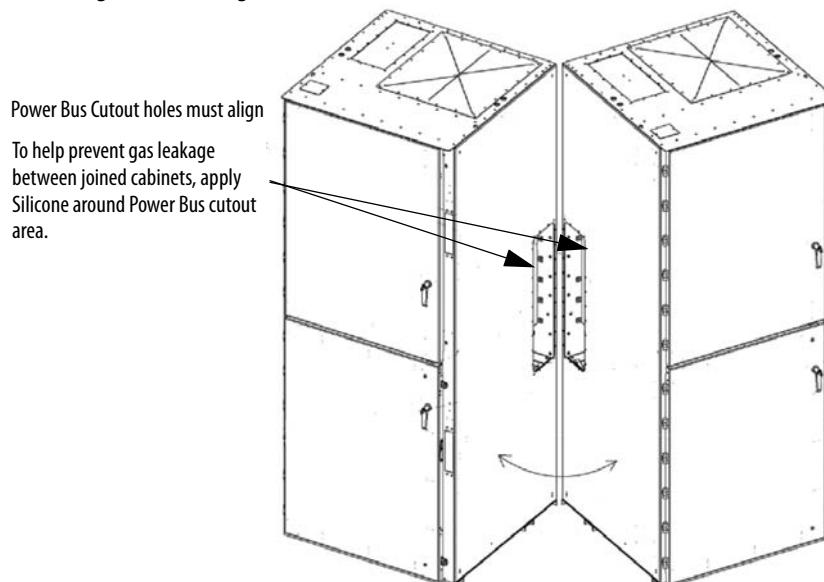


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**IMPORTANT** All anchor and adjacent cabinet-side holes that are used to secure the cabinet must be filled with hardware. Failure to have hardware in any of these holes compromise the arc resistant characteristics of the cabinet.

---

**Figure 21 - Joining the Sections**



## Access Power Bus



**ATTENTION:** This procedure requires contact with medium voltage components. To avoid shock hazards and lockout incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

### Rear Access

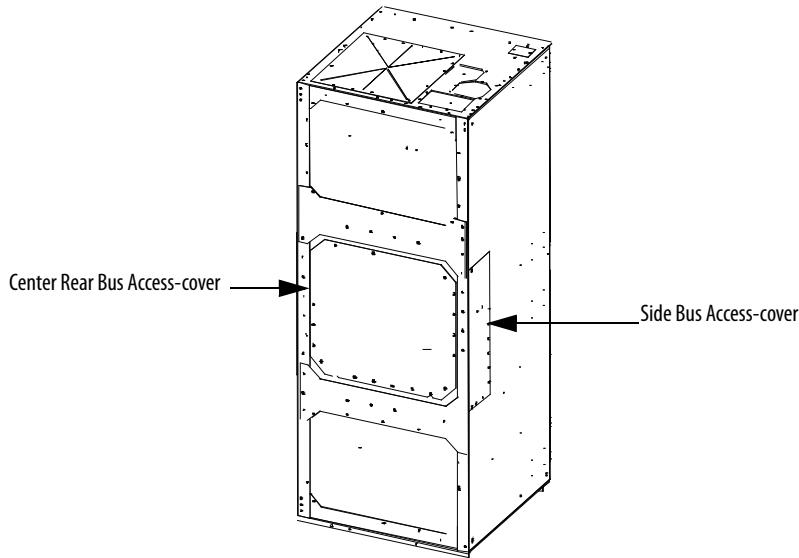
1. Remove the hardware securing the center rear bus access-cover ([Figure 22](#)).



**ATTENTION:** The rear cover plates are made from 12 gauge metal and are mounted in board of the main structure. The cover drops inside if care is not taken as you remove the mounting bolts.

2. Remove the center rear bus access-cover.
3. When the rear bus cover is removed, you see the three power bus bars ([Figure 24](#)) and grounding bus.

**Figure 22 - Access to Power Bus from Side and Rear of Cabinet, Typical**



### Side Access

A side bus access cover is on each side of the controller, when required.

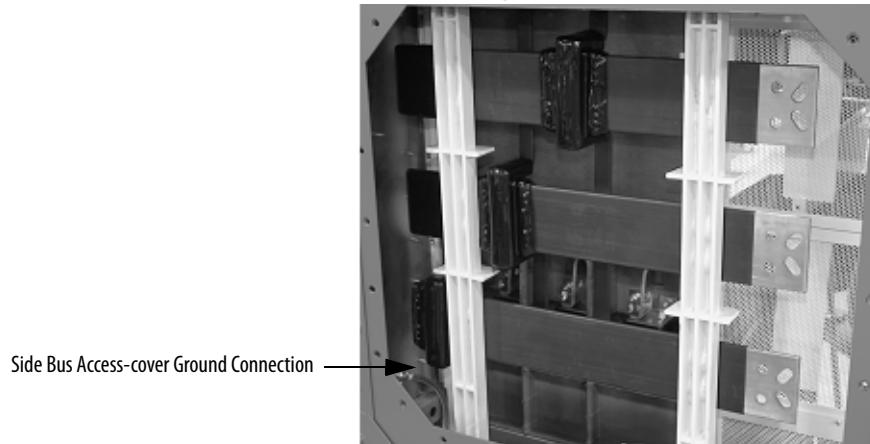
1. Remove the hardware from the appropriate side bus access cover.
2. Remove the side bus access cover ([Figure 22](#))

3. Ensure ArcShield units at the end of a line-up have a ground connection to the inner plate of the side bus access cover (see [Figure 23](#) and [Figure 24](#)). This connection must be maintained to ensure unit arc resistant performance.

**Figure 23 - ArcShield Side Bus Access Cover Warning Label**

| <b>CAUTION</b>   | <b>AVERTISSEMENT</b>   |
|--|--|
| <p><b>CONNECTION TO GROUND MUST BE MAINTAINED</b></p> <p>FAILURE TO DO SO MAY RESULT IN LOSS OF ARC RESISTANT INTEGRITY</p> <p>80006-350-02(1)</p> | <p><b>CONNEXION À LA MISE À LA TERRE DOIT ÊTRE MAINTENUE</b></p> <p>LE NON RESPECT DE CET AVIS PEUT CAUSER UNE PERTE D'INTÉGRITÉ DE LA RÉSISTANCE AUX ARCS</p> |

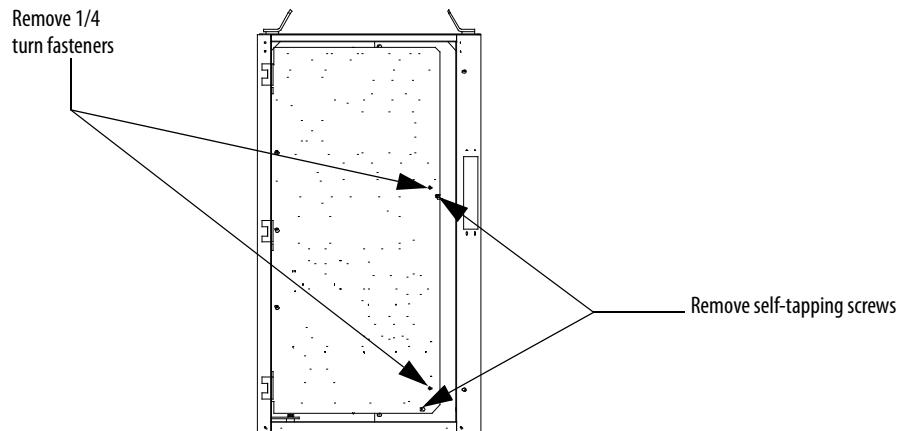
**Figure 24 - Side Bus Access-cover Ground Connection**  
(Rear Access-cover removed to show connection point)



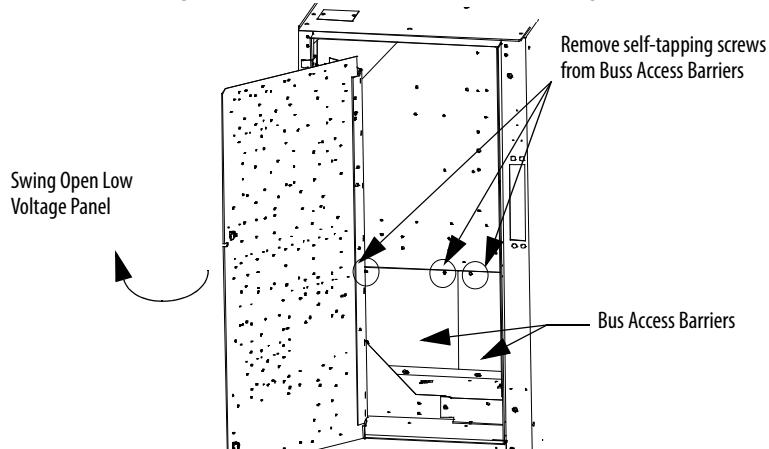
## Front Access – Top Entry

1. Complete the [Power Lockout Procedure on page 45](#) for both medium voltage power cell and the power bus.
2. Open low-voltage power cell door. See [Opening the Low Voltage Doors on page 23](#).
3. Remove the two self-tapping screws from the low voltage panel (see [Figure 25](#)).
4. Using a flat head screw driver, turn the 1/4 turn fasteners that hold the low voltage panel, counterclockwise, to swing open the panel (see [Figure 25](#)).

**Figure 25 - Low Voltage Panel**



**Figure 26 - Access to Power Bus with Low Voltage Panel Rotated**



5. Pull on right-hand side of low voltage panel. Swing low voltage panel to the front and left of cabinet (see [Figure 26](#)).

**TIP**

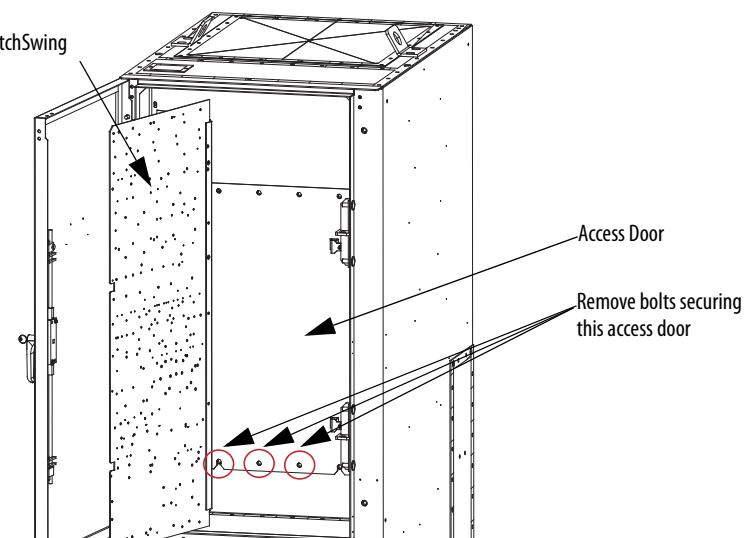
The power cell door must be in a fully opened position before rotating the low voltage panel.

6. Locate the two removable bus access barriers.
7. Remove the retaining screws from removable bus access barriers.

This step exposes the incoming cable connections to main bus (see [Figure 27](#)).

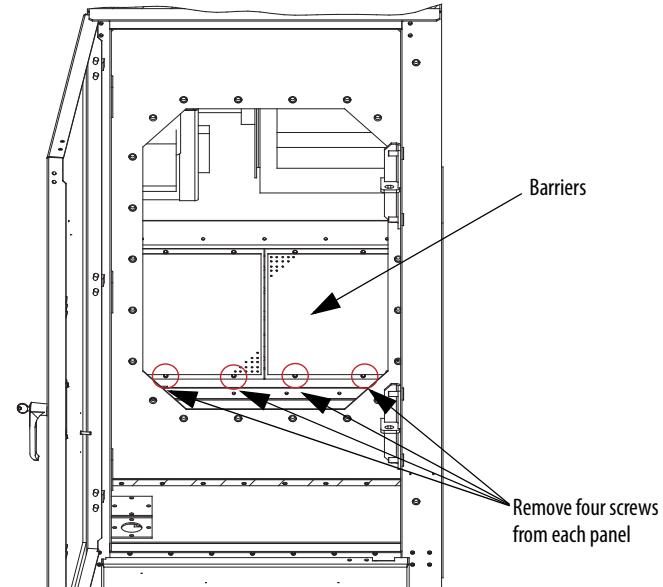
8. Remove the bolts on the high-voltage door ([Figure 27](#)).

**Figure 27 - Removal of Access Panel with Low Voltage Panel Rotated**

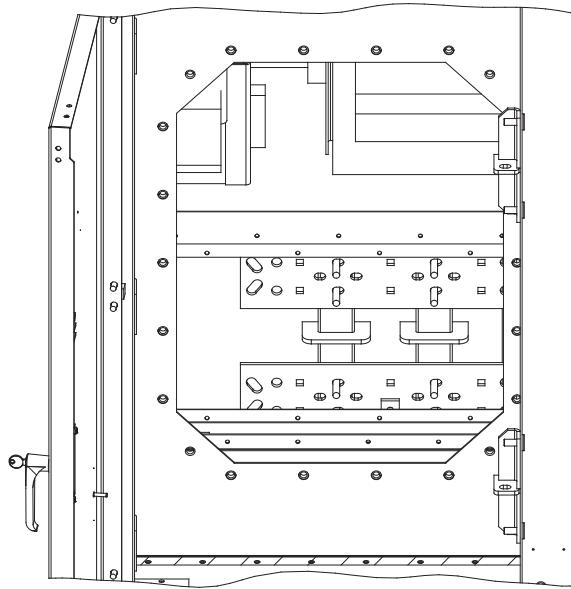


9. Remove the insulating barrier.

**Figure 28 - Removal of Low Voltage Barriers to Access Power bus**



10. When the insulating barrier is removed, you see the power bus bars. ([Figure 29](#))

**Figure 29 - Power Bus with Bottom Access Barrier Removed**

**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

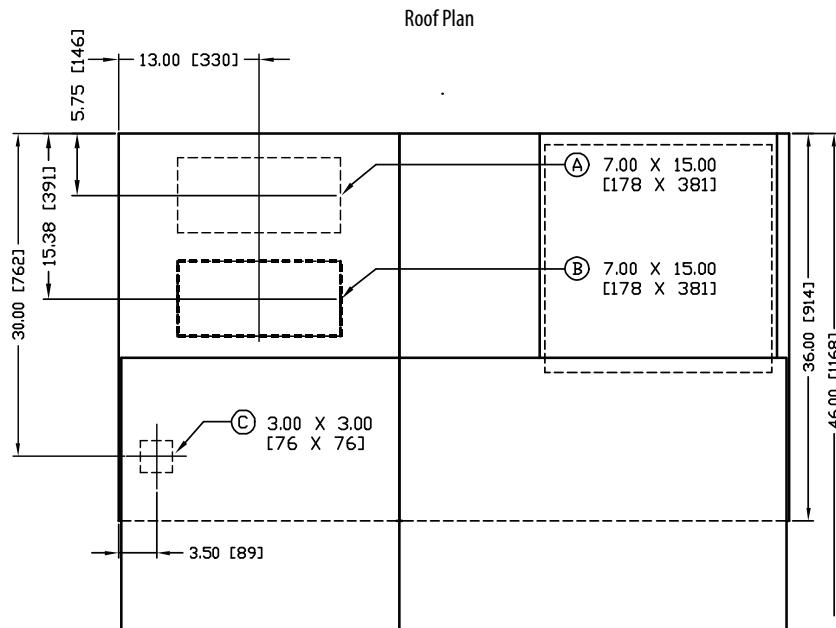
**IMPORTANT** The current transformers can be positioned for top or bottom cable exit. Follow the appropriate procedure that is described for your starter configuration.

**IMPORTANT** Load cable size must not exceed 1-1000 MCM, 2-750 MCM, 3-500 MCM, or 4-500 MCM per phase.

**IMPORTANT** See Dimensional Drawings that are provided with order Documentation for additional details that are related to cabinet floor plan.

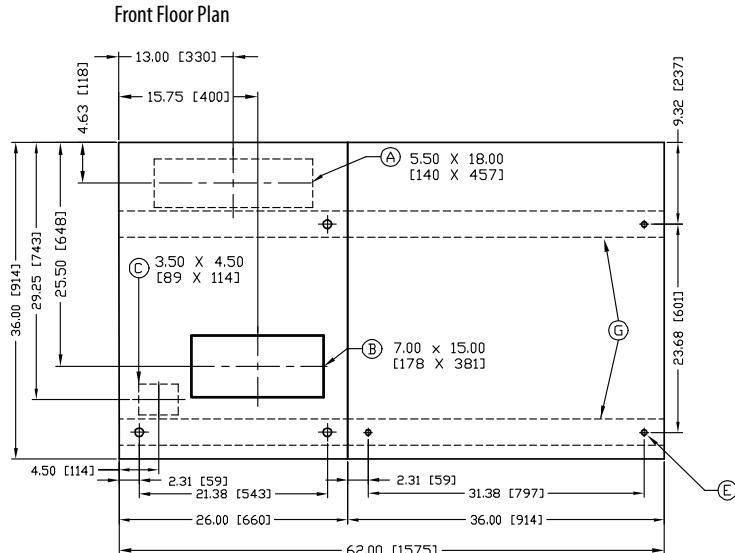
11. Complete the [Power Lockout Procedure on page 45](#).
12. Remove the appropriate cable conduit-opening plates from the cabinet (see [Figure 30](#) and [Figure 31](#)). The plate can be punched or cut to mount conduit.
13. Load cables for the power cell must be routed before control cables. Pull the cables into the cabinet through the appropriate opening (see [Figure 30](#) and [Figure 31](#)).
14. Connect the cables to the current transformers and tighten the connections to 48 lb•ft (65 N•m).
15. Connect cable shields (if present) to the ground lug.
16. Install all barriers and reassemble the cabinet.

**Figure 30 - Load Cable Conduit Openings, Arc Resistant Cabinet  
(Top Exit cable configuration is shown with plenum)**



**Figure 31 - Load Cable Conduit Openings, Arc Resistant Cabinet  
(Bottom Exit Cable Configuration shown)**

- Ⓐ Line Cable Conduit Opening.
- Ⓑ Load Cable Conduit Opening.
- Ⓒ Control Wire Conduit Opening.
- Ⓓ Plenum is removed and shipped separately.  
Customer must install.
- Ⓔ Do the Mounting Holes for M12 (1/2 in.) Diameter  
Anchor bolt.
- Ⓕ Removable Lifting Angles.
- Ⓖ 1.00 [25] x 30 [76] Non-removable Sill Channels.



**ATTENTION:** Make sure that all barriers are installed before re-energizing the equipment. Failure to do so can result in electrical faults, damage to equipment, or serious injury to personnel.

**Notes:**

## Common Installation

### Bus Splicing

#### Power Bus



**ATTENTION:** This procedure requires contact with medium voltage components. To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. The power and ground bus splice kit is mounted on the front of the shipping skid.

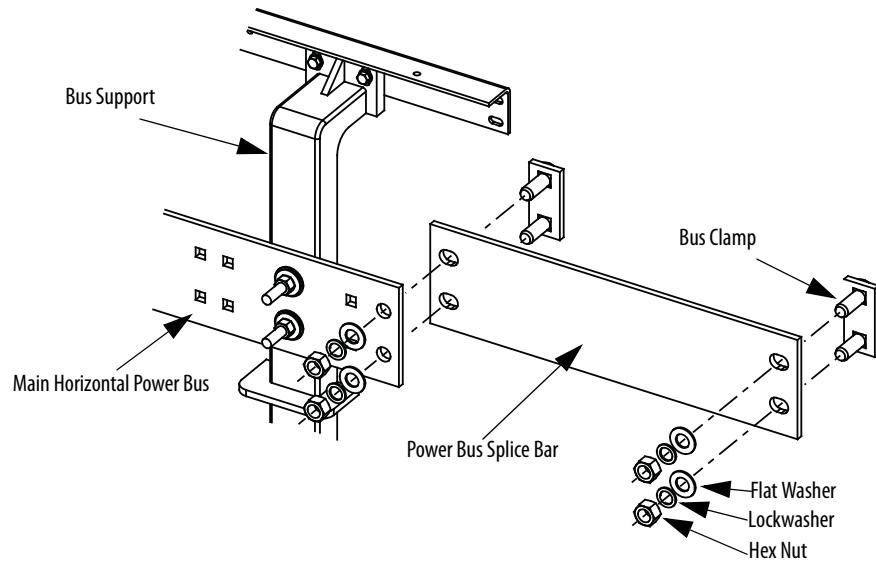
**IMPORTANT** Verify that the structure series numbers on the splice kit package match the structure series number that is found on the cabinet nameplate. See [Starter Identification on page 9](#) for details regarding the nameplate.

2. See [Access to the Power Bus on page 15](#) for Standard Enclosure and [Access Power Bus on page 28](#) for ArcShield™ Enclosure.
3. For a **1200A** power bus, assemble the splice bars as shown in [Figure 32 on page 36](#). Tighten the nuts to 48 lb•ft (65 N•m).  
For a **2000A** power bus, assemble the splice bars as shown in [Figure 33 on page 36](#). Tighten the nuts to 48 lb•ft (65 N•m).

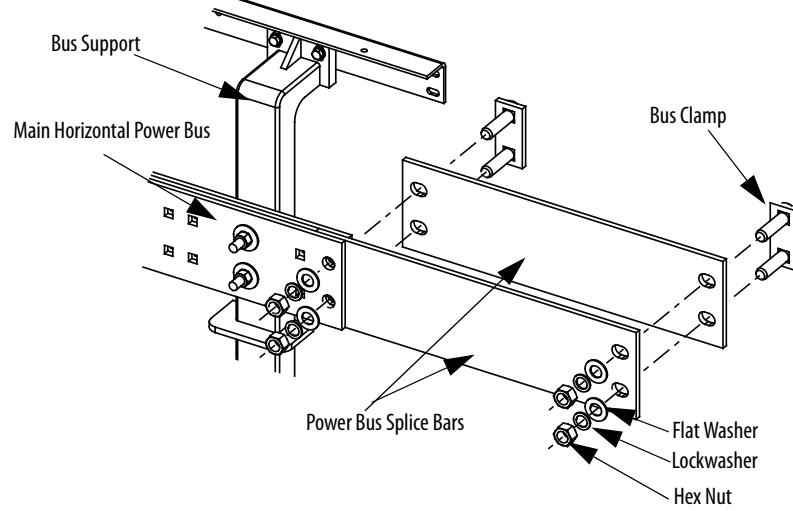
**IMPORTANT** Attach the bus links to the cabinet on the left side first - as viewed from the front of the unit.

**IMPORTANT** Place bus clamps on the rear side of each main horizontal bus or splice bar, as viewed from the front of the unit, see [Figure 32](#) or [Figure 33](#).

**Figure 32 - Typical 1200A Power Bus Splicing Configuration (Viewed from Front of Cabinet)**



**Figure 33 - Typical 2000A Power Bus Splicing Configuration (Viewed from Front of Cabinet)**



**ATTENTION:** Install all barriers before energizing the equipment. Failure to do so can result in electrical faults, damage to equipment, or severe injury to personnel.

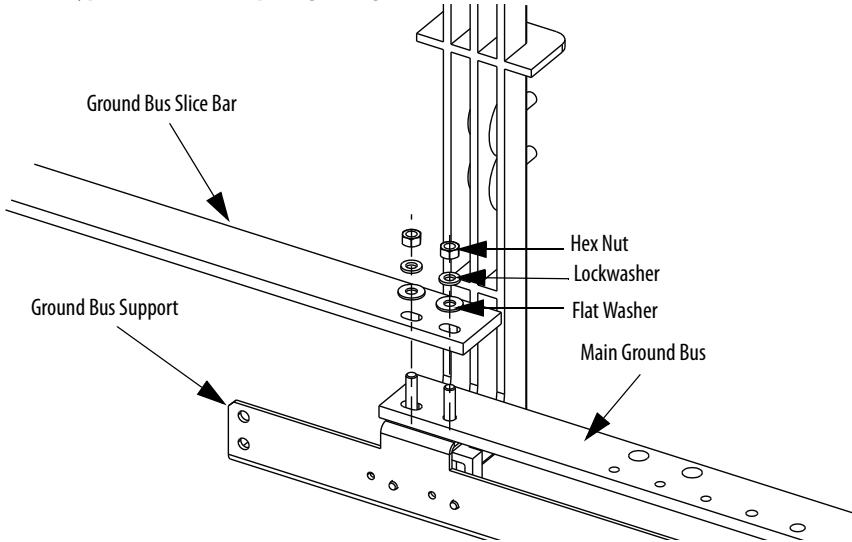
## Insulated Power Bus Splicing

If the starter is equipped with insulated power bus, a splice kit with insulated links, insulating boots, and tape is provided. See the kit for installation instructions.

## Ground Bus

1. See [Figure 34](#) to determine the correct ground splice configuration and assemble as shown.
2. Torque the hardware to  $15 \text{ N}\cdot\text{m} \pm 1 \text{ N}\cdot\text{m}$  ( $12 \text{ lb}\cdot\text{ft} \pm 1 \text{ lb}\cdot\text{ft}$ ).
3. Check all hardware for correct tightness and install all covers and plates.

**Figure 34 - Typical Ground Bus Splicing Configuration (Front View)**



**ATTENTION:** Install all barriers before re-energizing the equipment. Failure to do so can result in electrical faults, damage to equipment, or severe injury to personnel.

## Incoming Line Cable Connections



**ATTENTION:** This procedure requires contact with medium voltage components. To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

The incoming cables are connected to the power bus in the last section on the leftmost cabinet in a lineup.

**IMPORTANT**

For Non-ArcShield units, incoming line cable size must not exceed 1-750 MCM or 2-500 MCM per phase.

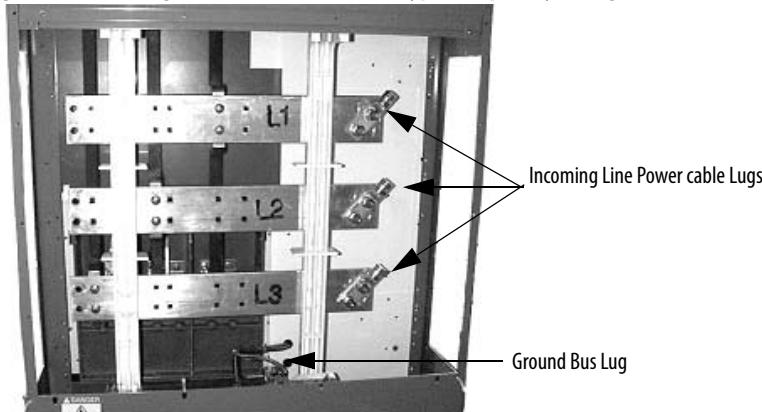
For ArcShield units, incoming line cable size must not exceed 1-500 MCM or 2-4/0 per phase.

For larger cables, an incoming line module must be used for either cabinet styles.

- To access the power bus, remove the center-back plate or side plate. If access to the rear of the unit is not possible, refer to:  
[Access to the Power Bus on page 15](#) for Standard Enclosure or  
[Access Power Bus on page 28](#) for ArcShield Enclosure.

- Connect the incoming power lines to the power bus ([Figure 35](#)).
- Torque to recommended values, see [page 10](#).

**Figure 35 - Incoming Line Cable Connections, Typical Top Entry Configuration**



**IMPORTANT** If the line cables require installation by front access, complete the incoming line connection before installing the load cables.

- Connect the ground wire to the ground bus lug.
- Connect any external control wires to the control panel terminal blocks in the low voltage compartment. See the wiring diagrams that are received with your order.

## Hi-Pot and Megger Test

Insulation integrity must be tested before medium voltage electrical equipment is energized. Use a high-voltage AC insulation tester or a Megger (5000 volt type is recommended).



**ATTENTION:** Exercise caution when performing high-voltage tests on the equipment. Failure to do so can result in electric shock, severe burns, injury, or death.



**ATTENTION:** Disconnect power factor correction capacitors (if so equipped) before performing the Hi-Pot test. Failure to do so can result in personal injury or damage to the equipment. See [Power Lockout Procedure on page 45](#) for information on how to dissipate any stored power in the capacitors.



**ATTENTION:** Remove all primary fuses for the control power transformer and/or the potential transformer. Failure to do so can damage the equipment during the Hi-pot test.

Insulation can be tested from phase to phase and from phase to ground. The recommended level for an AC Hi-Pot test is  $(2 \times V_{LL})$  volts, where  $V_{LL}$  is the rated line-to-line voltage of the power system. The leakage current must be less than 20 mA. Record the result for future comparison testing.

If a Megger is used, it can indicate 50,000 megohms or greater if the unit is isolated from the line and the motor. If the unit is connected to a motor, the Megger can indicate 5000 megohms or greater (phase to ground).

## Start-up Procedure

### Vacuum Contactor Inspection

See Publication [1502-UM051 -EN-P](#) for information on pre-energization inspection, vacuum bottle integrity test, and insulation resistance test.

### Preliminary Checks

Verify the following:

- Contactor current and voltage ratings are correct for the attached load.
- Control voltage is correct.
- Settings for protective relays.
- Heater elements (if provided) in overload relay are secure and undamaged.
- Equipment grounding
- External power and control connections match electrical diagrams.
- All hardware is installed and torqued to recommended values, see [page 10](#).
- All barriers are installed to correct positions.
- All fuses are correct class, type and rating.
- Mechanical interlocks and isolation switch function properly.
- Make sure that any microprocessor-based protection relay is programmed.
- Interior of cabinet is free from dirt, loose bolts, tools, or metal chips. Vacuum clean if necessary.
- All tools are accounted for. If you cannot locate a tool, do not energize the unit until it is found.

## Testing the Contactor Operation

1. Connect the appropriate external power supply (120V or 230V AC) to the test receptacle in the control panel. Turn the selector switch to the TEST position.



**ATTENTION:** Some control circuit configurations can require control jumpers to let the contactor close during the test procedure. Do not jumper any isolation switch contacts such as ISa or ISb (Figure 53 on page 56, for the location of these contacts). The use of jumpers for these contacts can result in equipment damage or injury to personnel.

2. Electrically operate the contactor several times. Inspect the armature plate and verify that it fully contacts the magnetic cores.
3. Turn the selector switch to the OFF position and unplug the test voltage.
4. Remove any metal filings or loose hardware from around the magnetic cores of the vacuum contactor. Debris is attracted to the coil when it is energized and could prevent the contactor from closing properly.

**Figure 36 - Typical Wiring Diagram: Electrically Held Vacuum Contactor (with IntelliVAC™ Control)**

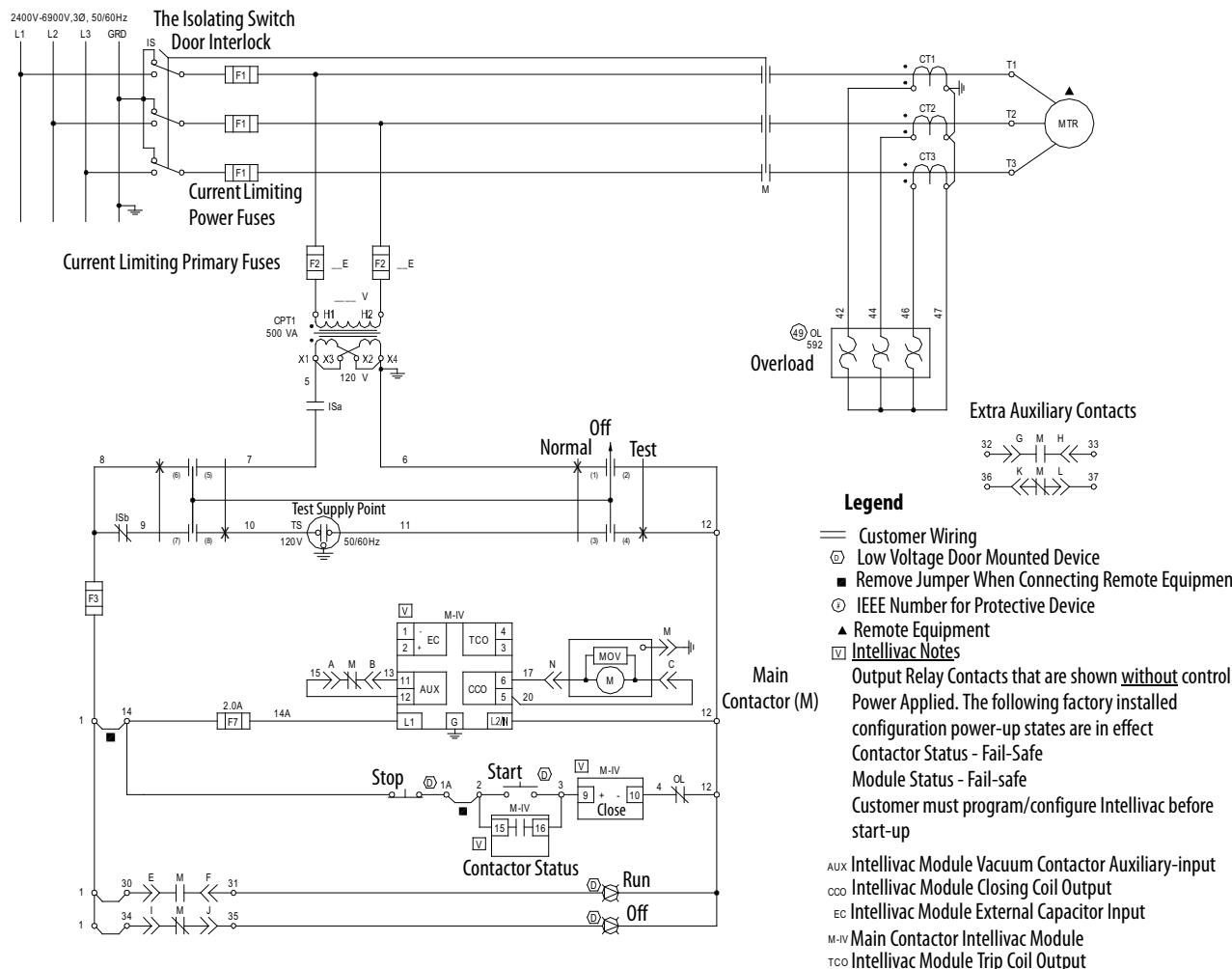
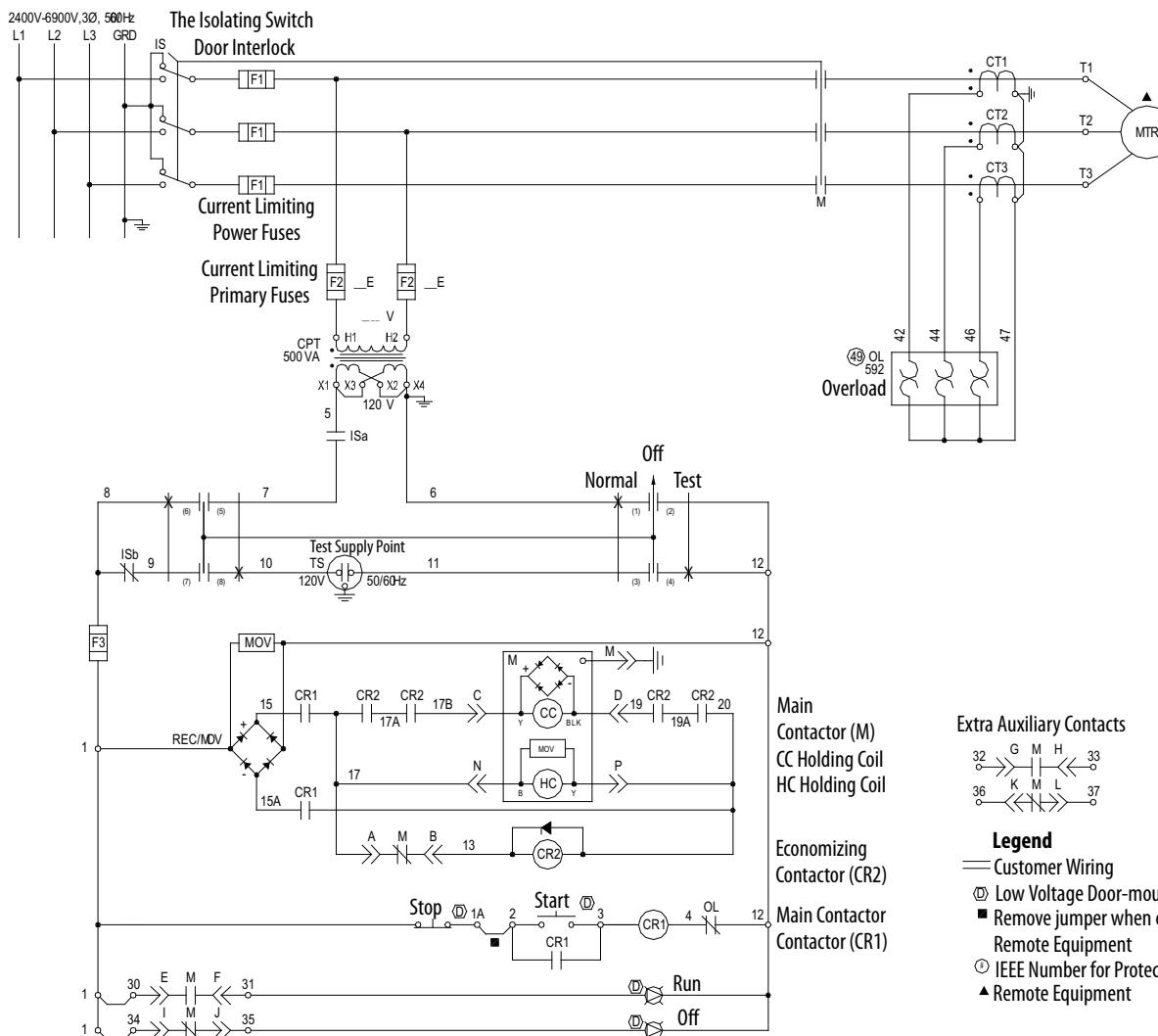


Figure 37 - Typical Wiring Diagram: Electrically Held Vacuum Contactor (with Relay Control)



**Notes:**

## Maintenance



**ATTENTION:** Use suitable personal protective equipment (PPE) per local codes or regulations. Failure to do so can result in severe burns, injury, or death.

**IMPORTANT**

Establish a maintenance and inspection schedule for the equipment. Service annually, or every 20,000 operation (whichever comes sooner) is the minimum recommended. Extreme operating conditions can warrant additional attention.

## Tool Requirements

**IMPORTANT**

Some components of this product incorporate Imperial hardware. Rockwell Automation® recommends the use of the appropriate tools to complete the maintenance procedures on these components. If you cannot obtain such tools, contact the Rockwell Automation sales office in your area for assistance.

If you cannot obtain the required tools, contact the Rockwell Automation sales office in your area for assistance.

| Tool                   | Specification  |
|------------------------|--|
| Torque wrench          | 0...48 lb·ft (0...65 N·m)                                    |
| Sockets                | 3/8 in.<br>7/16 in.<br>9/16 in.<br>3/4 in.<br>7/8 in.        |
| Racket                 | Handle and extension   |
| Wrenches               | 7/16 in.<br>1/2 in.<br>9/16 in.<br>3/4 in.<br>7/8 in.        |
| Feeler gauges          | 1.3 mm (0.050 in.)<br>2 mm (0.080 in.)<br>0.5 mm (0.020 in.) |
| Flat-blade screwdriver |  |
| NyoGel 759G Lubricant  | Rockwell Automation® part no. 80158-357-51                   |

**IMPORTANT** When installing the components, or when assembling the cabinet make sure that all bolts are installed using the [Recommended Torque Values on page 10](#).

## Door Interlock Circumvention



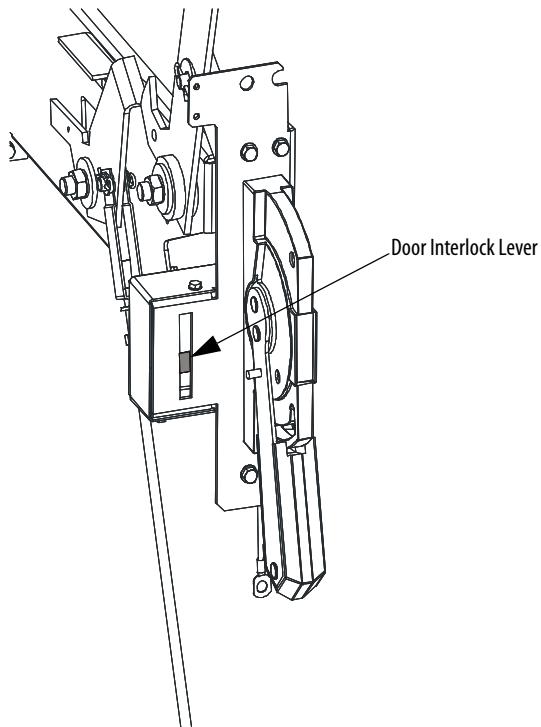
**ATTENTION:** The door interlock mechanism is designed to prevent access to the medium voltage cell while the unit is energized. When the unit is in operation, do not circumvent this interlocking safety feature. Always disconnect incoming power. Do the [Power Lockout Procedure on page 45](#) before proceeding with any adjustments that require the handle to be moved to the ON (closed) position. Failure to do so can result in electric shock with severe burns, injury, or death.

Some of the following sections can require moving the isolation switch handle to the ON position while the medium voltage door is open. The interlocking safeguards in the mechanism are designed to stop the handle from moving to the ON position while the cabinet door is open.

To circumvent this safety feature:

1. To depress the door interlock lever in a downward movement, use a screwdriver, or other tool
2. Hold the lever down while moving the handle to the ON (closed) position.

**Figure 38 - Door Interlock Lever**



## Power Lockout Procedure



**ATTENTION:** Use suitable personal protective equipment (PPE) per local codes or regulations. Failure to do so can result in severe burns, injury, or death.



**ATTENTION:** Always do the [Power Lockout Procedure](#) before servicing the equipment. Failure to do so can result in severe burns, injury, or death.



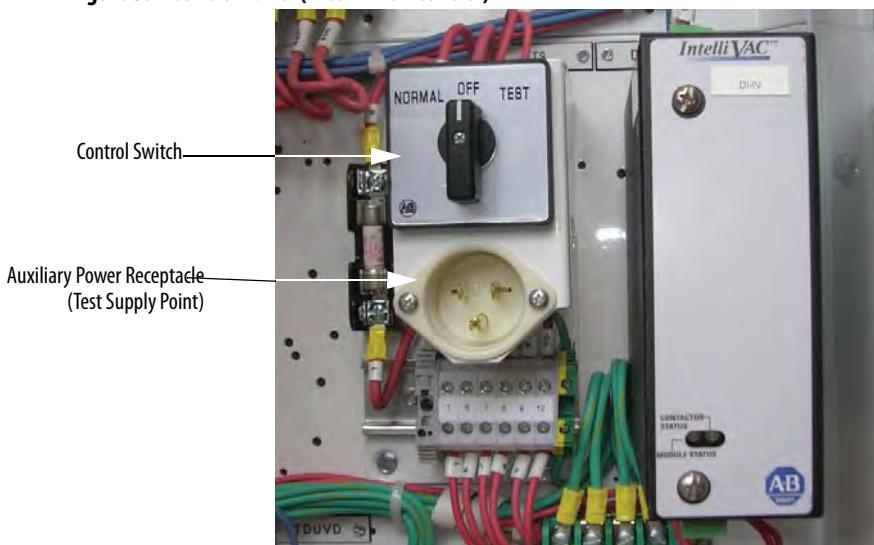
**ATTENTION:** The following procedure requires you to move the isolation switch handle to the ON position. To avoid shock hazards, disconnect incoming power. Do the [Power Lockout Procedure on page 45](#) before servicing of the equipment.



**ATTENTION:** Failure to do the [Power Lockout Procedure](#) results in a live power cell when the isolation switch handle is in the ON position. A live power cell can cause severe burns, injury, or death. Rockwell Automation does not assume any responsibility for injuries to personnel who have not completed the [Power Lockout Procedure](#) before servicing the equipment.

1. Disconnect and do a lockout of all feeder power supplies to the starter.
2. Move the isolation switch handle to the OFF position.
3. If the unit is equipped with power factor correction capacitors, the stored energy must be dissipated before entering the power cell. Wait at least 5 minutes before entering the power cell or dissipate the power with this procedure:
  - a. Verify that the isolation switch handle is in the OFF position.
  - b. Open the low voltage door.
  - c. Connect the appropriate power supply (120V or 230V) into the auxiliary control power circuit as shown on the electrical drawing.
  - d. Move the control switch to the TEST position.

**Figure 39 - Control Panel (IntelliVAC™ Control)**

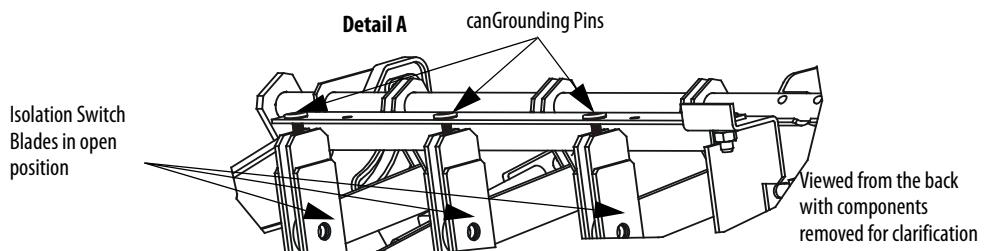
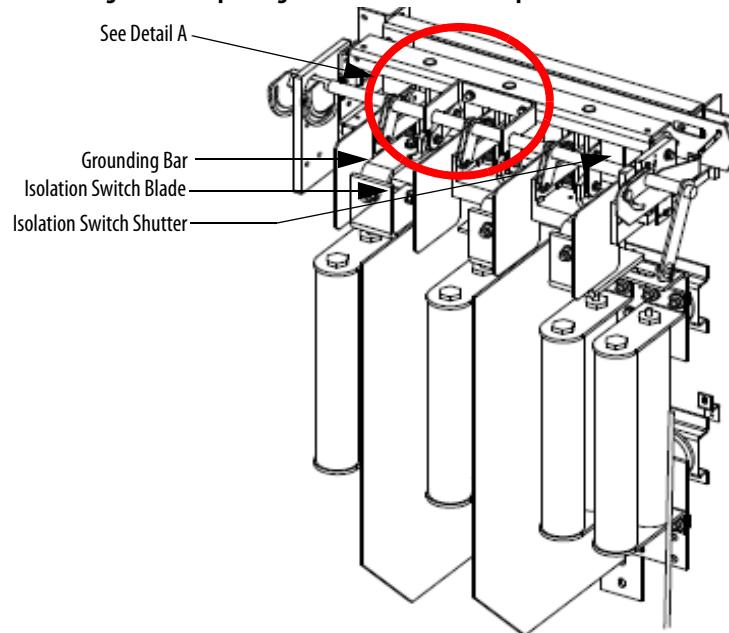


- e. Push the START button on the unit or at a remote location.  
Both operate the contactor electrically.
- f. Disengage the contactor and move the control switch to the OFF position. Disconnect the external power supply.
- g. Complete [Power Lockout Procedure on page 45](#)

4. Open the medium voltage door.

5. Visually inspect that the isolation switch blades fully engage the grounding pins on the grounding bar. The isolation switch shutters must be closed (see [Figure 40](#)).

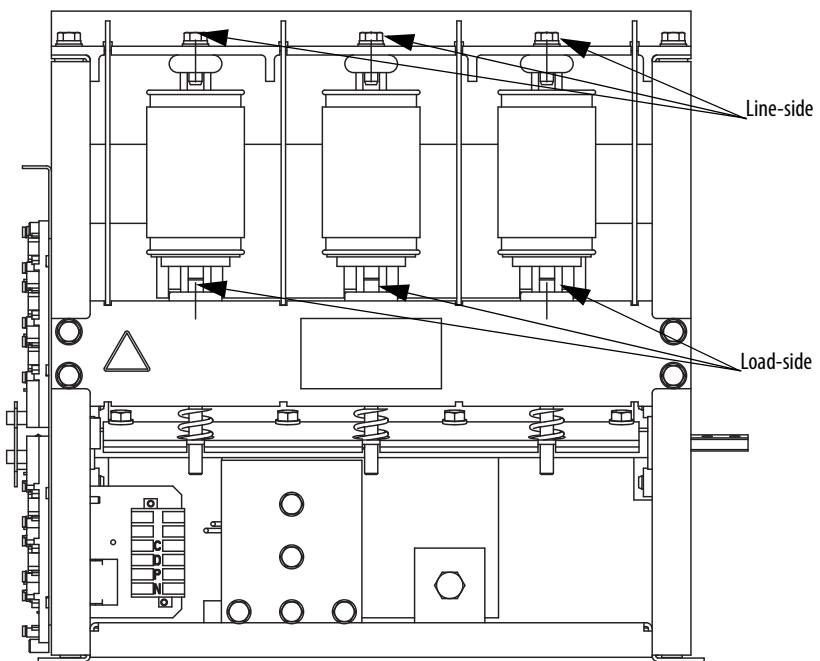
**Figure 40 - Inspecting the Isolation Switch in Open Position**



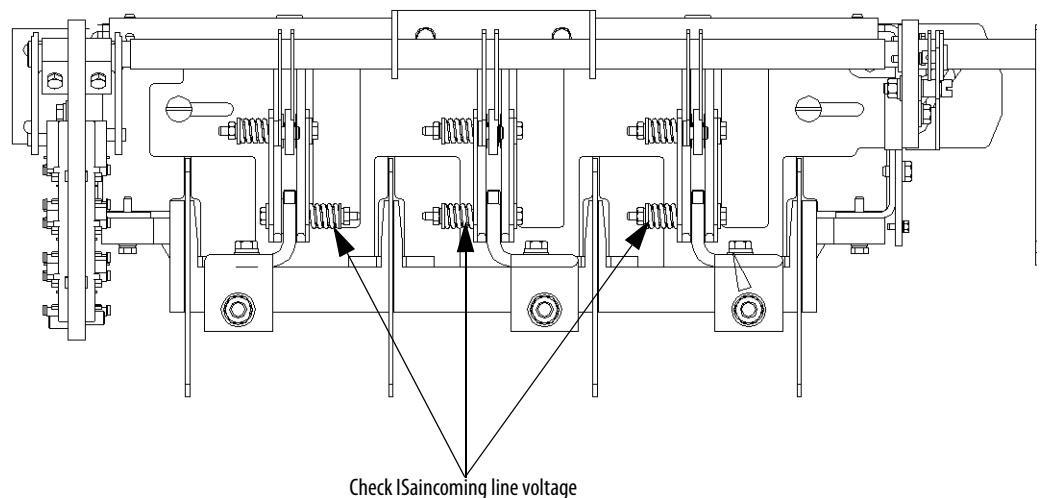
6. Check the line and load sides of the contactor with a hot stick or appropriate device for voltage measurement of the system. Verify that they are voltage free (see [Figure 41](#)).

7. Check for line-side voltage at the top vacuum bottle terminals.

8. Check for load-side voltage at the bottom vacuum bottle terminals.

**Figure 41 - Contactor Voltage Checkpoints**

9. Refer to [Door Interlock Circumvention on page 44](#) to move the isolation switch handle to the ON position.
10. Check the isolation switch blades with a hot stick or appropriate device for voltage measurement of the system. Verify that they are voltage free (see [Figure 42](#)).

**Figure 42 - Isolation Switch Voltage**

11. When all power circuits are verified to be voltage free, move the isolation switch handle back to the OFF position. The unit is now safe to service.

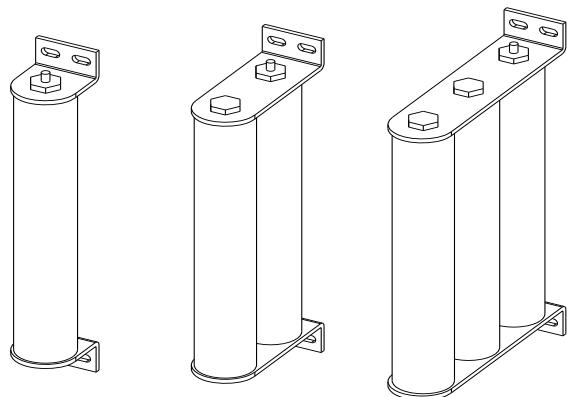
## Fuse Removal and Replacement



**ATTENTION:** Only personnel who are trained and understand the Bulletin 1500 product line are to work on this equipment. Always use suitable safety equipment and procedures.

### Bolt-on Fuses

Figure 43 - Bolt-on Fuses



**ATTENTION:** Servicing energized industrial control equipment can be hazardous. Severe injury or death can result from electrical shock, burn, or unintended actuation of control equipment. Hazardous voltages can exist in the cabinet even with the circuit breaker in the off position. Recommended practice is to disconnect or Lockout control equipment from power sources, and confirm discharge of stored energy in capacitors. If it is necessary to work in the vicinity of energized equipment, the safety-related work practices of NFPA 70E, Electrical Safety requirements for Employee Work places, must be followed.



**ATTENTION:** To avoid electrical shock, make sure that the main power is disconnected and equipment is tagged and locked out. Verify that all circuits are voltage free using a hot stick or appropriate voltage-measuring device. Failure to do so can result in injury or death.

#### IMPORTANT

The main power fuse has a pop-up indicator pin that is at one end of the fuse. When a fuse has opened, the indicator is in its extended position. The fuse must be oriented in the fuse clip assembly so that the indicator is at the top.



**ATTENTION:** The fuses can be hot for up to one hour after operating. Verify the temperature before handling and use insulated hand protection if needed. Failure to do so can result in burns.

## Bolt-on Fuse Removal and Installation

Tools required:

- 3/8-in. drive ratchet
- 2 in. extension
- 6 in. extension
- 12 in. extension
- 1/2 in. Socket
- 3/8 in. Drive torque wrench

**IMPORTANT** The fuse configuration determines what length of extension is required to get at the mounting hardware. The fuse configuration also determines what size of interphase barriers are installed. The lower barriers can be removed to provide better access to the fuse mounting nuts.

1. Remove the two lower mounting nuts, lockwashers and flat washers from the mounting studs.
2. Remove the upper two mounting nuts, lockwashers and flat washers from the mounting studs and remove the fuse from the fuse mounting studs.
3. Install the replacement fuse on the four mounting studs, hold the fuse in place, and install the upper two flat washers, lockwashers and nuts. Torque nuts to 12 lb•ft.
4. Install the lower two flat washers, lockwashers and nuts. Torque the nuts to 12 lb•ft.
5. If, interphase barriers were removed, make sure that they are properly reinstalled.

## Contactor Maintenance

See Medium Voltage Contactor, 800A, Publication [1502-UM051 -EN-P](#) for contactor maintenance instructions.

### Removing the Contactor

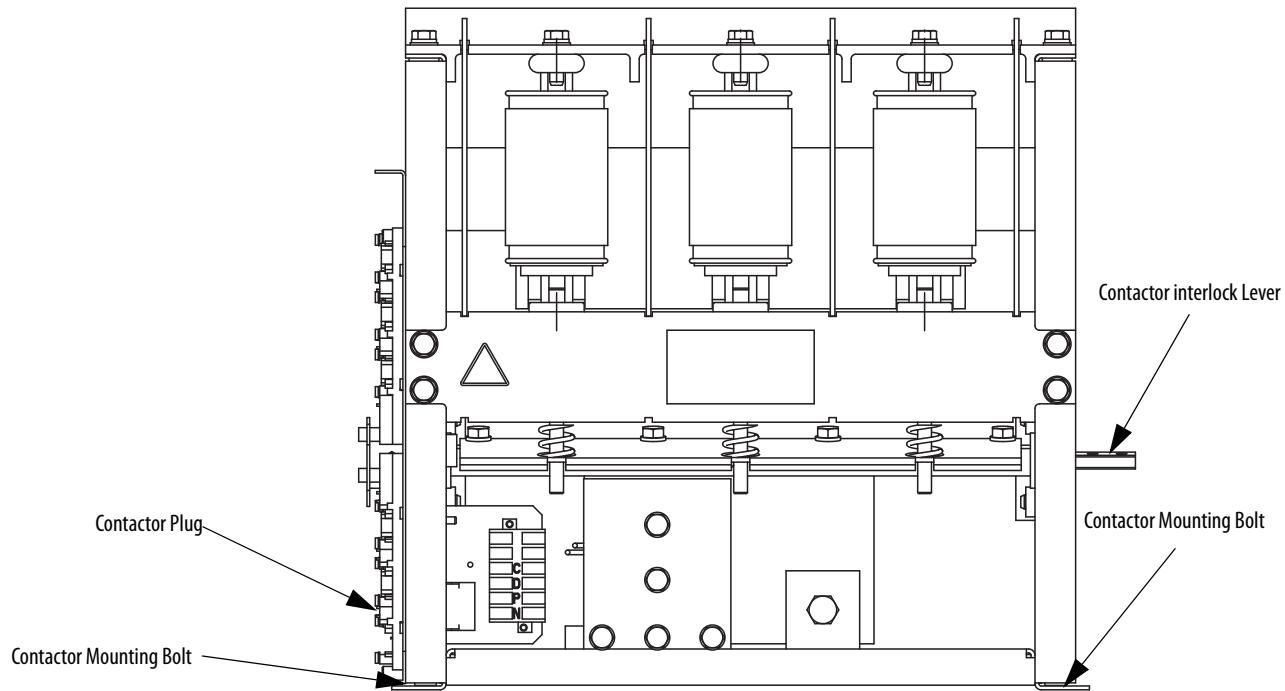


**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before servicing of the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

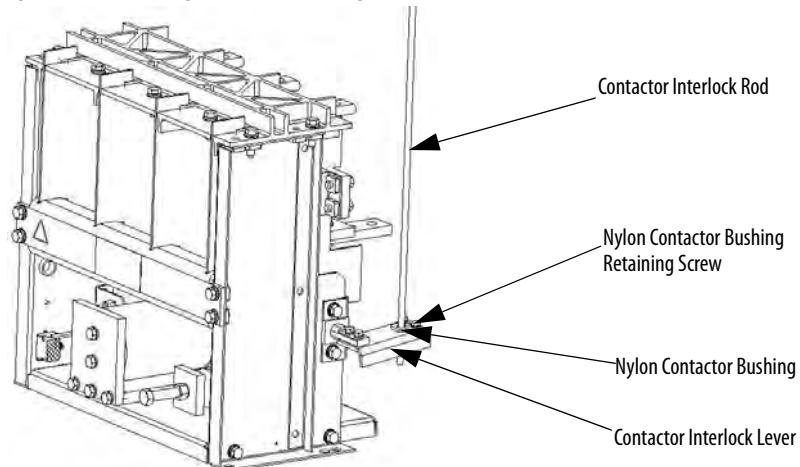
1. Complete the [Power Lockout Procedure on page 45](#).
2. Disconnect the control wiring-harness from the wire plug at the lower left side of the contactor (see [Figure 43](#)).
3. Use a 9/16 in. Socket wrench to disconnect the power cables from the rear of the contactor.

4. Remove the nylon contactor bushing retaining-screw from the contactor interlock lever. Slide the contactor interlock rod and the nylon contactor bushing out of the groove in the contactor interlock lever (see [Figure 44](#)).

**Figure 44 - Removing the Contactor (Front View)**



**Figure 45 - Removing the Contactor (Right-side view)**



5. Remove the two contactor mounting bolts at the front of the contactor.
6. Carefully remove the contactor from the cabinet.



**ATTENTION:** The contactor weighs approximately 100 lb (45 kg) and assistance can be required to remove it safely from the cabinet and transport it. Failure to use caution when moving the contactor can result in equipment damage and/or personal injury.

7. If the contactor is being replaced with a new one, move the contactor interlock lever to the new contactor.



**ATTENTION:** The retaining screw is critical to the mechanical integrity of the isolation switch. It is important to make sure that this screw is installed during reassembly.

8. To reinstall the contactor, reverse the procedure. Make sure the mounting bolts, power cable hardware, and bus bar hardware is properly torqued. See [Recommended Torque Values on page 10](#).
9. Adjust the contactor interlock rod according to the [Contactor Interlock Rod Adjustment on page 51](#).

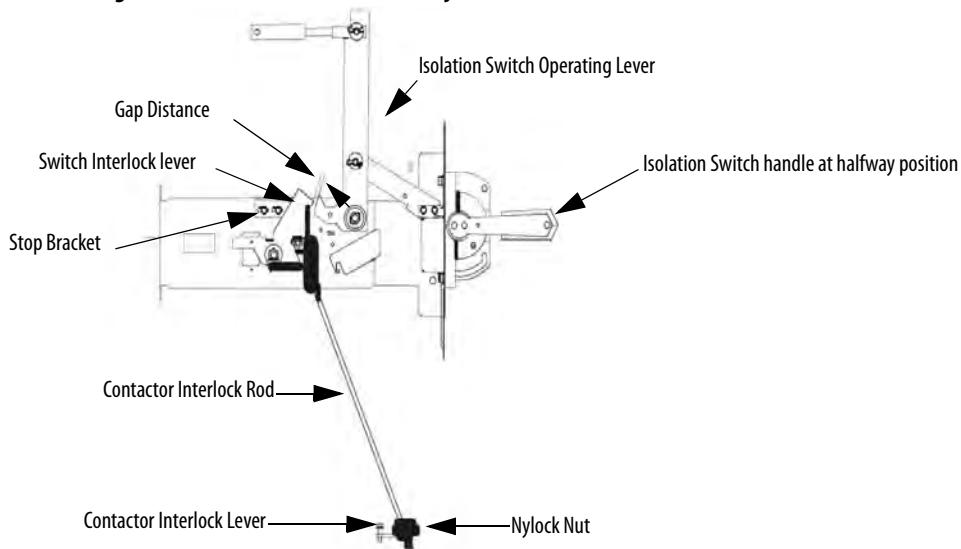
## Contactor Interlock Rod Adjustment



**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. Complete the [Power Lockout Procedure on page 45](#).
2. Open the medium voltage door. Use the [Door Interlock Circumvention on page 44](#) to move the isolation switch handle halfway between the OFF and ON position (see [Figure 46](#)). Keep the handle in this position until the adjustment procedure is completed.
3. With the contactor in the OFF position, insert a 1.5 mm (0.060 in.) feeler gauge in the gap between the interlock lever and the isolation switch operating lever. The gap must be between 1.0...2.0 mm (0.039...0.078 in.).
4. To reduce the gap distance, follow steps 5...7.  
To increase the gap distance follow steps 8...10.

**Figure 46 - Isolation Switch Handle Adjustments**



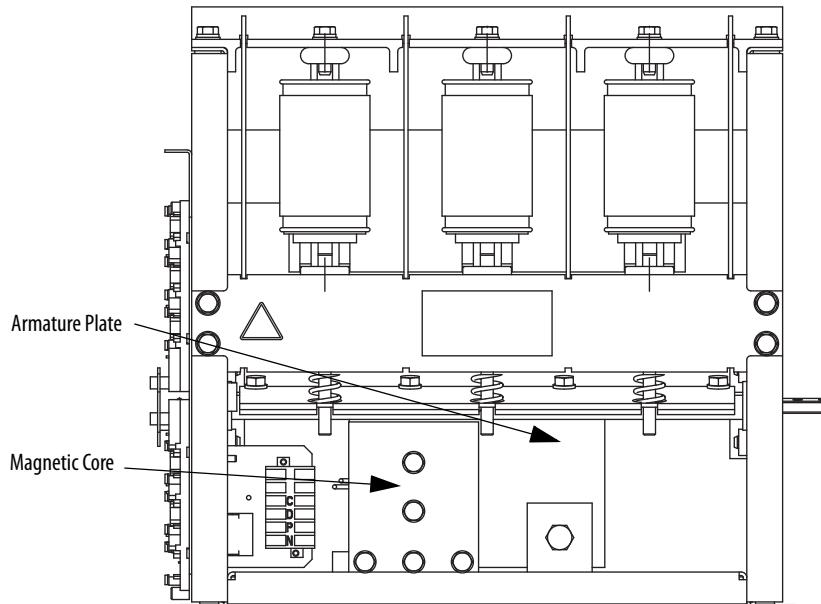
## Reduce the Gap Distance

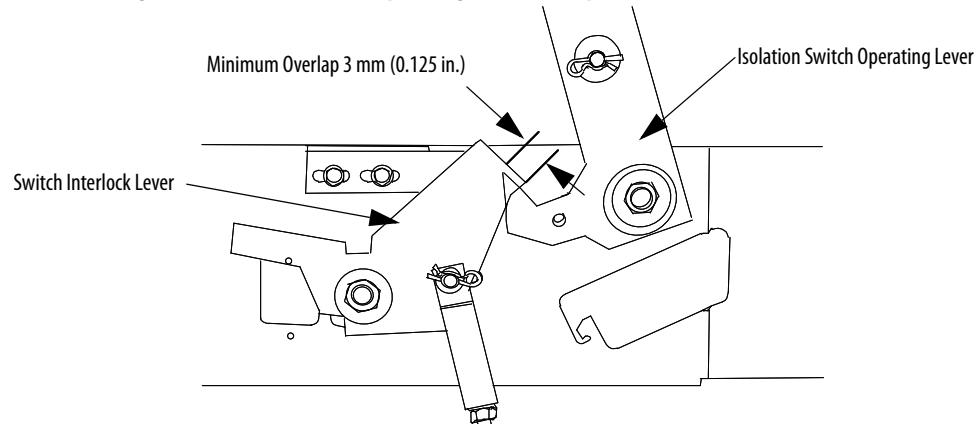
5. Loosen the two screws in the stop bracket and move up the stop bracket against the interlock lever.
6. With the feeler gauge positioned in the gap, move the interlock lever and the stop bracket closer to the isolation switch operating lever to reduce the gap space. Tighten the stop bracket screws.
7. Tighten the nylock nut until it is snug against the contactor interlock lever. Do not overtighten the nylock nut as it moves the interlock lever and reduce the gap. Proceed to Step 11.

## Increase the Gap Distance

8. Loosen the two screws in the stop bracket and move the stop bracket away from the interlock lever.
9. Loosen the nylock nut until the gap reaches the necessary size.
10. Move the stop bracket until it just touches the interlock lever and tighten the screws.
11. Apply Loctite 290 (or equivalent adhesive) to the stop bracket screws and torque the screws to 6 lb•ft (8 N•m).
12. Move the isolation switch handle to the ON position.
13. Manually close the contactor by attaching locking pliers to the contactor interlock lever and pushing down until the armature plate contacts the magnetic cores (see [Figure 47](#)). Verify that the interlock lever overlaps the isolation switch operating lever by at least 3 mm (0.125 in.). See [Figure 48](#).

**Figure 47 - Closing the Contactor Manually (Front View -some parts not shown)**



**Figure 48 - Isolation Switch Operating Lever Overlap**

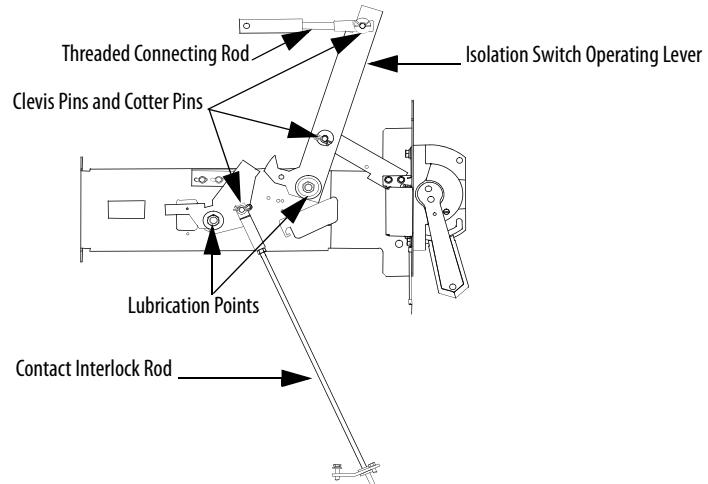
14. Open the contactor. Verify that the interlock lever and the rod move freely and that the return springs move the assembly back to the starting position.

## Isolation Switch Mechanism Inspection and Lubrication



**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. Open the medium voltage door.
2. Inspect the condition of the clevis pin and cotter pins that are shown in [Figure 48](#). Replace any worn parts.
3. If the isolation switch operating lever or the interlock lever require replacement, apply lubricant to the pivot points before installing the new components (see [Figure 49](#)). Use Dow Corning 55 O-ring lubricant (Rockwell Automation part no. RU-8216, or equivalent)

**Figure 49 - Isolation Switch Handle Mechanism Lubrication Points**

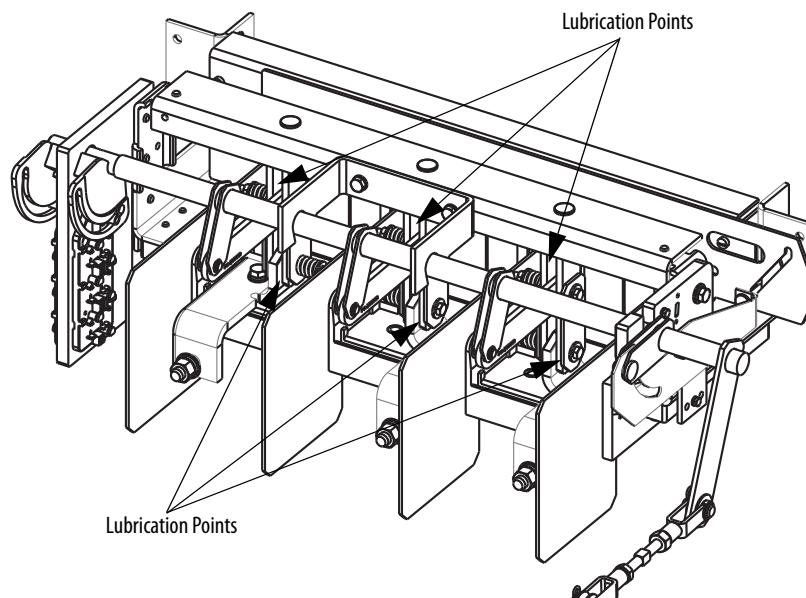
4. Inspect the mounting hardware on the isolation switch operating lever and contactor interlock rod (see [Figure 49](#)). Tighten any loose hardware.
5. Inspect the isolation switch blades and the incoming line stabs (see [Figure 50](#)). The mating surfaces must be clean and well-lubricated.
6. Remove any dirt and dried grease.

**IMPORTANT** Do not scrape or file the parts. Scrapping or filing can remove the plating and expose the underlying copper to corrosion.

7. Lubricate the isolation switch blades and the pivot points of the isolation switch blade with NyoGel 759G (see [Figure 50](#)).

**IMPORTANT** Lubricate the isolation switch blades a minimum of once per year. Lubrication avoids excessive wear to the components and help prevent the isolation switch blades from overheating.

**Figure 50 - Isolation Switch Lubrication Points**

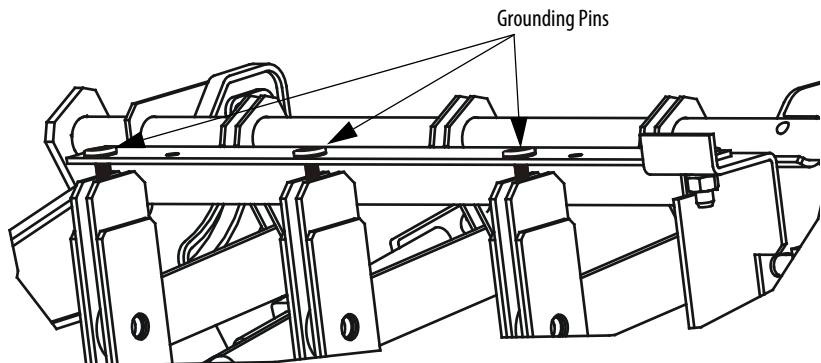


## Isolation Switch Mechanism Grounding Adjustment



**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free with a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. Inspect the grounding of the isolation switch blades. When the isolation switch handle is in the OFF position, the isolation switch blades must fully engage the grounding pins. The blades must also be within 1.5 mm (0.06 in.) of the ground bar (see [Figure 40](#)). When the isolation switch handle is in the ON position, the blades must fully engage the incoming line stabs.

**Figure 51 - Isolation Switch Grounding Adjustment**

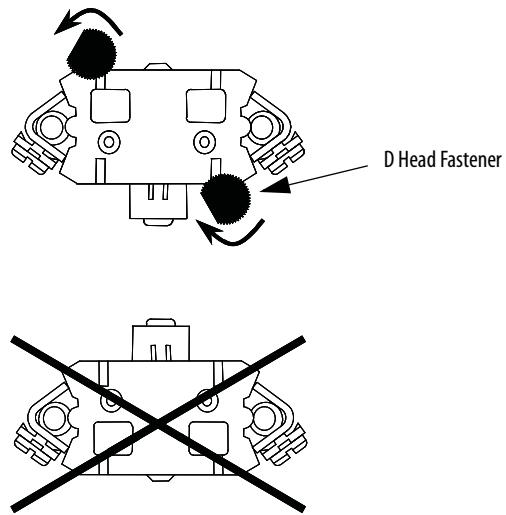
2. To adjust the distance from the blades to the bar, disconnect the threaded connecting rod at the handle operating lever, see [Figure 49](#)).
3. To adjust the position of the isolation switch blades in the ON and OFF position. Turn the threaded connecting rod to lengthen or shorten it.

## Auxiliary Contacts Inspection and Replacement



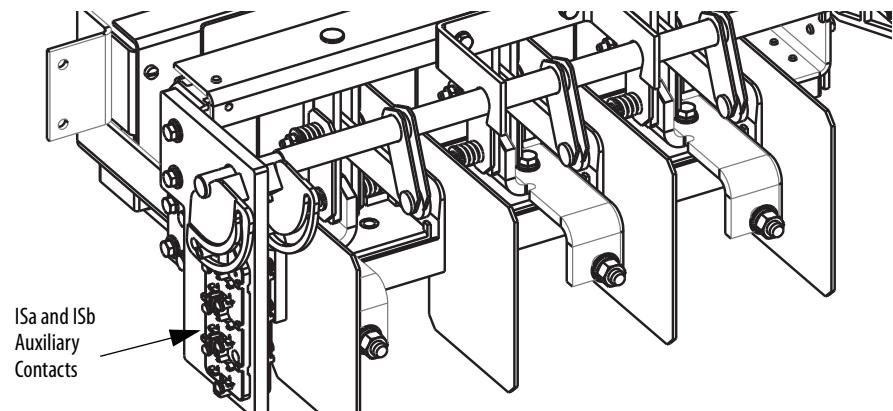
**ATTENTION:** To avoid shock hazards and stop incoming power, do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free with a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. Inspect the auxiliary contacts for wear, scorching, or heat damage.
2. Replace any damaged contacts. The contacts have a mean time between failure (MTBF) rating of 20 million operations, when used within the operating specifications.
3. To remove the contact, turn both of the D-head fasteners until the flat sections are aligned with the edge of the contact (see [Figure 51](#)).
4. Remove the contact from the housing.
5. Disconnect the wires from the auxiliary contact.
6. To reinstall the auxiliary contact, reverse the procedure.
7. Make sure that the contact is correctly positioned into the contact carrier (see [Figure 52](#)).

**Figure 52 - Auxiliary Contact Orientation**

The auxiliary contacts are mounted on the left side of the isolation switch, slightly below the cams on the isolation switch shaft.

Normally open contacts (Isolation Switch a) ISa contacts are on the outside of the isolation switch housing. Normally closed contacts (Isolation Switch b) ISb Contacts are on the inside of the housing.

**Figure 53 - Location of ISa and ISb Auxiliary Contacts**

ISa and ISb contacts are the same (700 CPM). The cam controls the normally open or normally closed status of the contacts.

See [Figure 36 on page 40](#) and [Figure 37 on page 41](#) for wiring diagrams.

**IMPORTANT**

The [Isolation Switch Mechanism Grounding Adjustment on page 54](#) must be completed before adjusting the auxiliary contacts to make sure of proper synchronization of the assembly.

## Isolation Switch Auxiliary Contacts

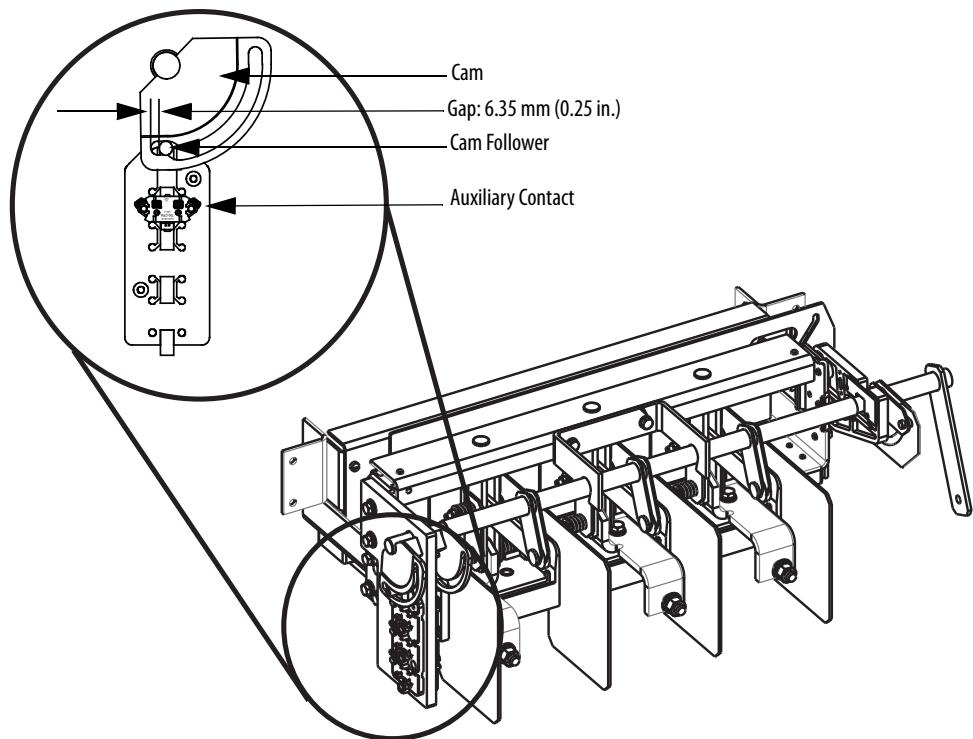
### Adjusting the Normally Open (ISa) Contacts



**ATTENTION:** To avoid shock hazards and stop incoming power do the [Power Lockout Procedure on page 45](#) before working on the equipment. Verify that all circuits are voltage free by using a hot stick or appropriate device that measures voltage. Failure to do so can result in severe burns, injury, or death.

1. Move the isolation switch handle to the OFF (open) position.
2. Loosen the bolt that holds the outside cam to the shaft. Do not loosen the bolt entirely. The cam must not be able to rotate freely on the shaft.
3. Move the isolation switch hand to the ON (closed) position and check that nothing stops the cam from rotating with the shaft.
4. Insert a 6.35 mm (0.25 in.) diameter pin into the cam groove between the cam follower and the end of the cam groove.

Figure 54 - Adjusting Auxiliary Contacts (ISa Auxiliary Contact Shown)



5. Adjust the cam on the shaft. The gap from the cam follower to the end of the cam groove must be the width of the pin 6.35 mm (0.25 in.).
6. Move the isolation switch handle to the OFF (open) position and check that nothing stops the cam from rotating with the shaft.
7. Tighten the bolt holding the cam to the shaft. Move the isolation switch handle to the ON position and recheck the gap using the pin.
8. Verify that auxiliary contact ISa is open when the isolation switch is open. Verify that ISa contact is closed when isolation switch is closed.

## Adjusting the Normally Closed (ISb) Contacts

1. Move the isolation switch handle to the OFF (open) position.
2. Loosen the bolt holding the inside cam to the shaft. Do not loosen the bolt entirely. The cam must not be able to rotate freely on the shaft.
3. Insert a 6.35 mm (0.25 in.) diameter pin into the cam groove between the cam follower and the end of the cam groove.
4. Adjust the cam on the shaft. The gap from the cam follower to the end of the cam groove must be the width of the pin 6.35 mm (0.25 in.).
5. Tighten the bolt that holds the cam to the shaft. Move the isolation switch handle to the OFF position and recheck the gap using the pin.
6. Operate the isolation switch handle several times, then recheck the 6.35 mm (0.25 in.) clearance between the end of the cam groove and the follower pin for both cams.
7. Verify that auxiliary contact ISb is closed when isolation switch is open.  
Verify that ISb contact is open when isolation switch is closed.

## Adjusting the Change of State Point

**IMPORTANT** This procedure sets the secondary electrical interlock. When properly adjusted, the electrical interlock is designed to open the control power circuit before the isolation switch opens as the isolation switch handle is moved to the OFF position.

1. After adjusting the auxiliaries, move the isolation switch handle to the ON position.
2. Connect a device that measures conductivity across the closed auxiliary contacts.
3. Slowly move the isolation switch handle towards the OFF position and observe the point at which the movable isolation switch blades separate from the incoming line stabs. The auxiliary contacts must change state from the closed to open position before the isolation switch blades lose contact with the incoming line stabs. This step prevents the isolation switch from being opened while the unit is energized and under load conditions.



**ATTENTION:** The auxiliary contacts must be properly adjusted to avoid opening the isolation switch under load conditions. Improper adjustment can result in damage to the equipment and/or severe burns, injury, or death to personnel.

4. If the auxiliaries do not change state before the isolation switch opens, repeat the auxiliary contacts adjustment procedure (see [page 57](#)).

## Emergency Circumvention Procedure for Power Cell Entry

The interlocking mechanism of the medium voltage starter is designed to prohibit access to the power cell. Access is denied while the isolation switch handle is in the ON position and the isolation switch is closed.

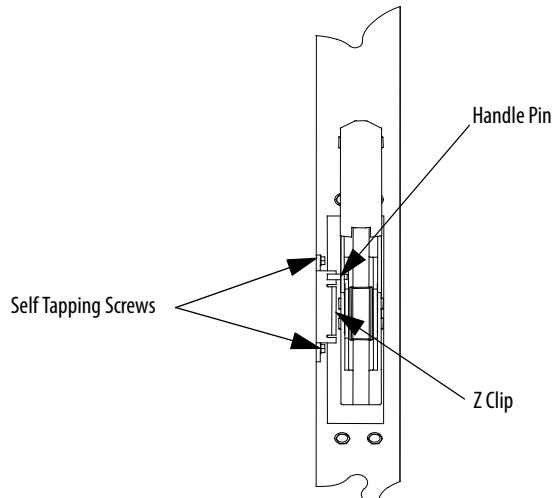
**IMPORTANT** The following procedure is intended to be used only when the isolation switch cannot be opened as described in the [Door Opening Procedure on page 11](#).



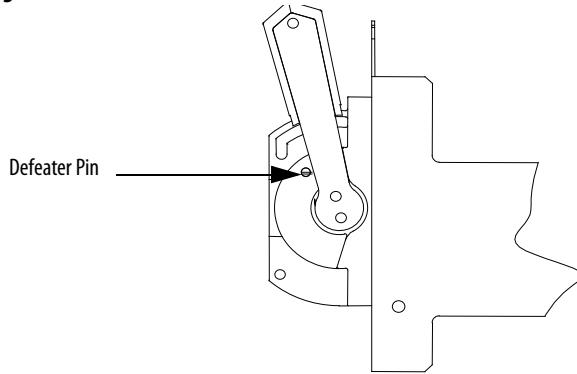
**ATTENTION:** This procedure can expose personnel to energized medium voltage components. Whenever possible, lockout incoming power before beginning this procedure. If you are unable to lockout incoming power, use the appropriate protective equipment and work practices to avoid shock hazards. Failure to do so can result in severe burns, injury, or death.

1. Remove the two 0.25-20 self-tapping screws from the Z-clip and remove the Z-clip.

**Figure 55 - Z Clip**



2. Remove the two door locking bolts.
3. Using a flat-headed screwdriver, turn the defeater pin on the right side of the isolation switch handle (see [Figure 56](#)).
4. Open the power cell door.

**Figure 56 - Defeater Pin**

- If it is possible to move the isolation switch handle to the OFF position for reassembly, follow steps 5...10.
- If it is not possible to move the isolation switch handle to the OFF position for reassembly, follow steps 11...13.



**ATTENTION:** The Z-clip assembly must be reassembled to help ensure the interlocking mechanism functions properly. Failure to do so lets personnel access live medium voltage parts and can cause severe burns, injury, or death.

#### *Installing Z-clip with Isolation Switch Handle in the OFF Position*

5. Reattach the Z-clip ([Figure 55 on page 59](#)) using the self-tapping screws, but do not completely tighten them.
6. Move the isolation switch handle to the OFF position.
7. Swing the door closed and inspect the position of the Z-clip that is related to the handle pin.
8. Set the Z-clip so that it is just above the handle pin. Do not set the Z-clip more than 3 mm (0.125 in.) above the pin. Open the door and tighten the screws.
9. Close the door and move the handle to the ON position. Verify that the handle pin overlaps the Z-clip and prevents the door from opening.
10. Move the handle to the OFF position and tighten the door locking bolts.

#### *Installing Z-clip with Isolation Switch handle in the ON Position*

11. Close the door and tighten the door locking bolts.
12. Position the Z-clip as shown in [Figure 55 on page 59](#). Make sure that the handle pin overlaps the top portion of the Z-clip.
13. Using the self-tapping screws, reattach the Z-clip.
14. Complete steps 5...10 at the earliest opportunity to confirm that the Z-clip assembly is correctly installed.

## Spare Parts

The list of spare parts is valid for typical Bulletin 1512A and 1512AT units. Contact your local Rockwell Automation® office to help ensure that the following part numbers are available.

For 800A contactor spare parts, refer to Bulletin 1502 800A Medium Voltage Contactor User Manual, Publication [1502-UM051\\_EN-P](#).

### Spare Parts List

**Table 2 - Spare Parts List**

| Part Number                     | Description   | Recommended Stocking Quantity |
|---------------------------------|---|-------------------------------|
| 80154-991-59                    | LV Control Panel (Electrically Held) <sup>(2)(3)</sup>                        | 1                             |
| 80154-991-61                    | LV Control Panel (Mechanical Latch) <sup>(2)(3)</sup>                         | 1                             |
| 1503VC-BMC5                     | IntelliVAC™ (Electrically Held and Mechanical Latch) <sup>(4)</sup>           | 1                             |
| 1503VC-BMC5-EM1                 | IntelliVAC™ Plus (Electrically Held and Mechanical Latch) <sup>(5)</sup>      |                               |
| 80174-902-14-R                  | Internal IntelliVAC fuse – 6.3 A, 250V (Littlefuse 21506.3) <sup>(4)(5)</sup> | 1                             |
| Engineering Data <sup>(1)</sup> | Power Fuses <sup>(6)</sup>  | 3                             |
| Engineering Data <sup>(1)</sup> | Primary Fuses (CPT/PT)  | 2                             |
| Engineering Data <sup>(1)</sup> | LV Control Circuit Fuses  | 2                             |
| Engineering Data <sup>(1)</sup> | Heater Elements (if used)   | 3                             |
| 40266-515-03                    | 20 A Isolation Switch Auxiliary Contact Cartridge (700 CPM)                   | 2                             |
| PN-272006                       | Rear Stationary terminals   | 3                             |
| 80178-750-51                    | Phase A Isolation Switch Blade Assembly 800 A                                 | 1                             |
| 80158-147-52                    | Phase B and C Isolation Switch Blade Assembly 800 A                           | 2                             |
| 80158-357-51                    | Nyogel 759G Lubricant   | 3                             |
| RU-8216                         | Dow Corning 55 O-ring Lubricant   | 1                             |

(1) Consult spare parts list in service manuals that are provided following delivery of equipment.

(2) The following is included with the LV Control Panel: CR1 relay, CR2 relay, rectifier, MOV assembly, test switch, test plug. **Note:** For mechanical latch assemblies, an additional CR1 relay is substituted for the CR2 relay.

(3) For starters with Electromechanical control.

(4) For starters with IntelliVAC™ control.

(5) For starters with IntelliVAC™ Plus control.

(6) Power fuses are R rated for motor loads or E rated for non-motor loads. Power fuses are sized to the motor or transformer load data that is provided at the time the starter is ordered. See dimensional drawings for specific fuse type and size. Bolt-on or clip-on fuses are available for various load sizes. Contact Rockwell Automation for details.

**Notes:**

## ArcShield™ Unit Information

### Overview

ArcShield™ units have a robust arc resistant enclosure design that is tested per IEEE C37.20.7. Each ArcShield™ structure was tested to withstand the effects of an arc flash at 40 kA or 50 kA for 0.5 s. ArcShield units provide an enhanced Type 2B Accessibility level.

### ArcShield Design

ArcShield units typically include a pressure relief vent on the roof of the structure (some incoming units cannot have a pressure relief vent if top cable entry is required). Under arc flash conditions, the pressure relief vent opens to allow hazardous flames and gases to exit the enclosure via plenum or chimney system. The low voltage panel area is sealed to prevent flames and gases from entering; however, suitable personal protective equipment (PPE) must be used whenever working on live circuits.



**ATTENTION:** To help ensure Arc resistant integrity, it is important to follow these rules:

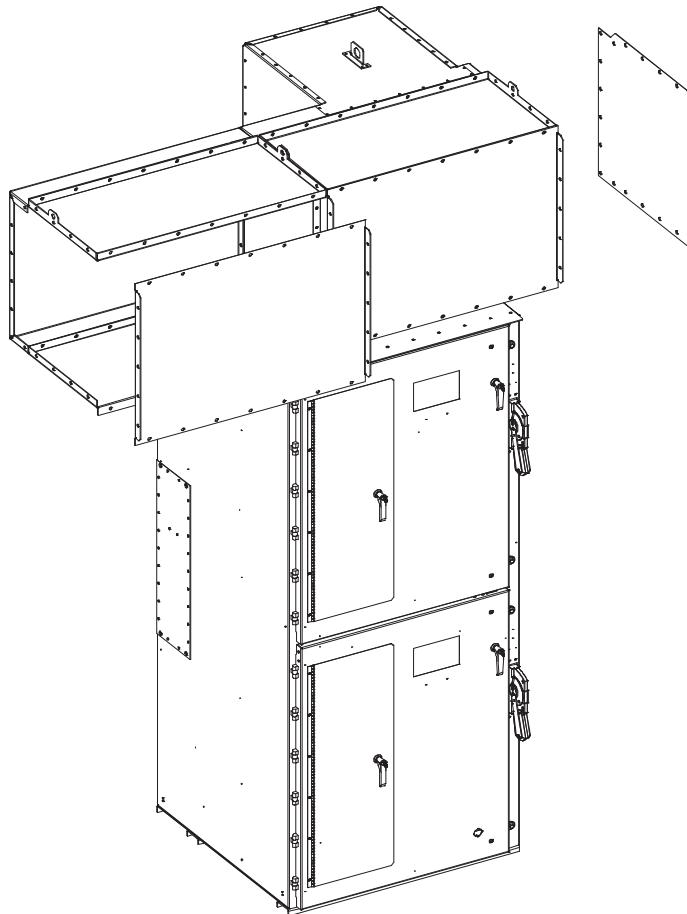
- The pressure relief vent cannot be tampered with. Do not use it as a step.
- No alterations can be made to the ArcShield structure.
- All covers, plates, and hardware that is removed for installation or maintenance purposes must be reinstalled and properly secured. Failure to do so voids the arc resistant integrity.
- Treat power cable entry points as the boundary between a hazardous location and sealed accordingly. Failure to do so voids the arc resistant integrity.
- A plenum or chimney must be used to direct the arc flash energy to a suitable location. Failure to do so voids the arc resistant integrity. See [Appendix B](#) for plenum installation instructions. See [Appendix C](#) for chimney installation instructions.
- All wiring between the low voltage panel and the power cell must be routed through a suitable gland. This routing is to help ensure flames and gases are not transmitted into this area (as fitted from factory).
- The medium-voltage power cell doors must be properly secured by using both the handle mechanism and the door bolts (refer to instruction label on the power cell door and in [Chapter 3](#)). Failure to do so voids the arc resistance integrity.

## Exhaust Systems: Chimney or Plenum Information Plenum Option

A plenum can be provided for each unit. The plenum can be field-mounted on the top of the unit structure (some incoming units cannot have a plenum if top cable entry is required). The purpose of the plenum is to direct the hazardous flames and gases away from the top of the arc resistant enclosure. Unit plenums are secured to the top of the unit structure and to adjacent plenums to create a continuous conduit for release of the arc flash energy. See [Appendix B](#) for plenum installation instructions.

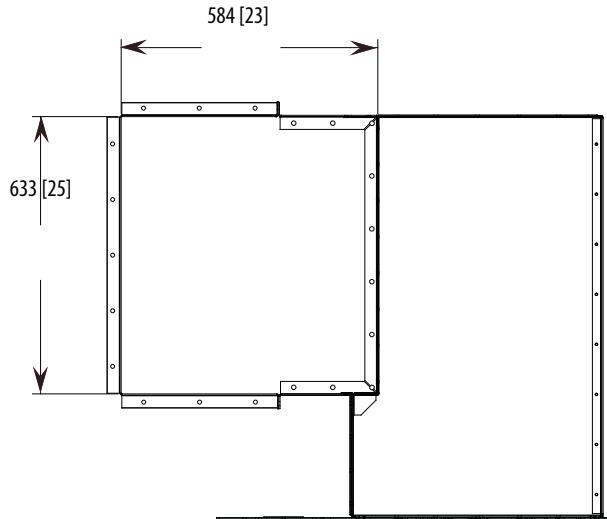
Each plenum, ArcShield line-up includes a plenum exhaust piece that extends beyond either the left or right ends of the line-up. The other end of the plenum is capped with an end cover. Extensions can be added to the plenum. The extensions can allow the arc flash energy and plasma gases to be safely vented to an area further away from the ArcShield line-up.

**Figure 57 - Elements of the ArcShield Plenum**



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Figure 58 - Cross-section of plenum extension, dimensions in mm [in.]



## Plenum Exhaust Considerations

The options for locating the plenum exhaust are:

1. Plenum ducted to an area of the control room where arc gases are permitted to escape, with plenum extensions (see [Figure 59](#), [Figure 60](#), and [Figure 61](#)).
2. Plenum duct to outside of control room (see [Figure 59](#) and [Figure 60](#)).

Plan the location where the plenum exhausts. Make sure that:

- There is no access to personnel while equipment is energized.
- Area is free of flammable material or vapors.

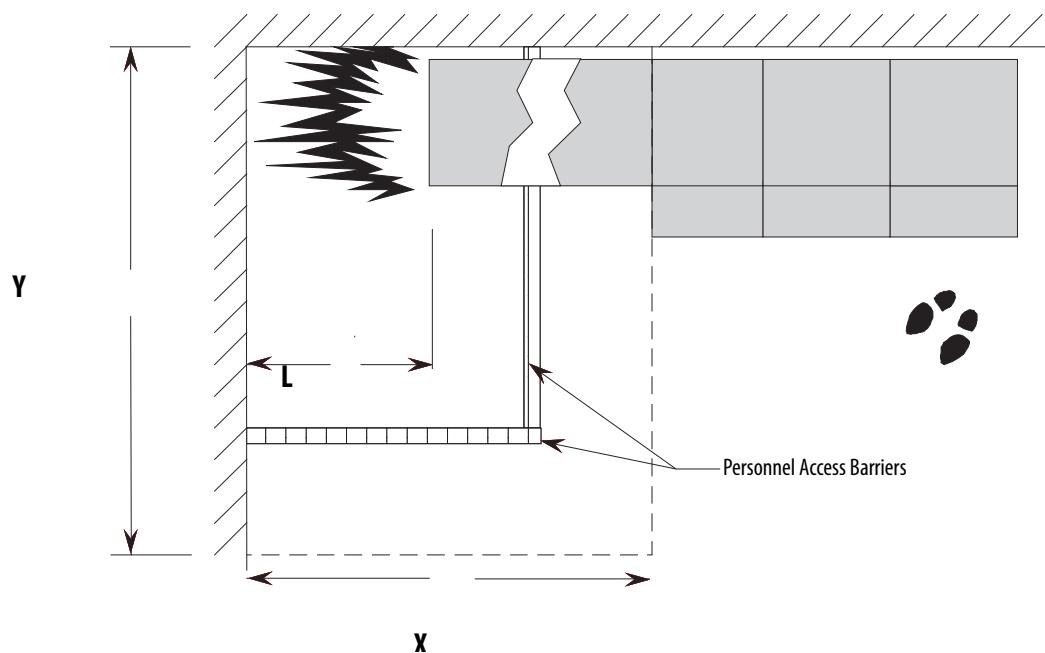
Make sure that adequate space is provided around the plenum exhaust, as outlined in [Figure 59](#) through [Figure 61](#).

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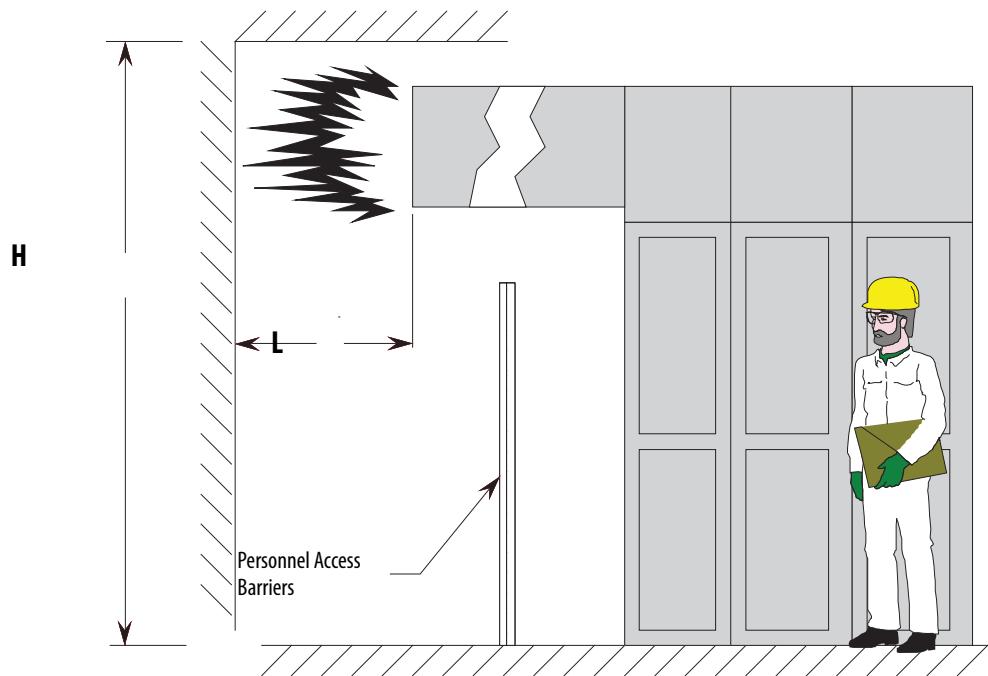
**IMPORTANT** Equipment in the area of the plenum exhaust point can be damaged or destroyed.

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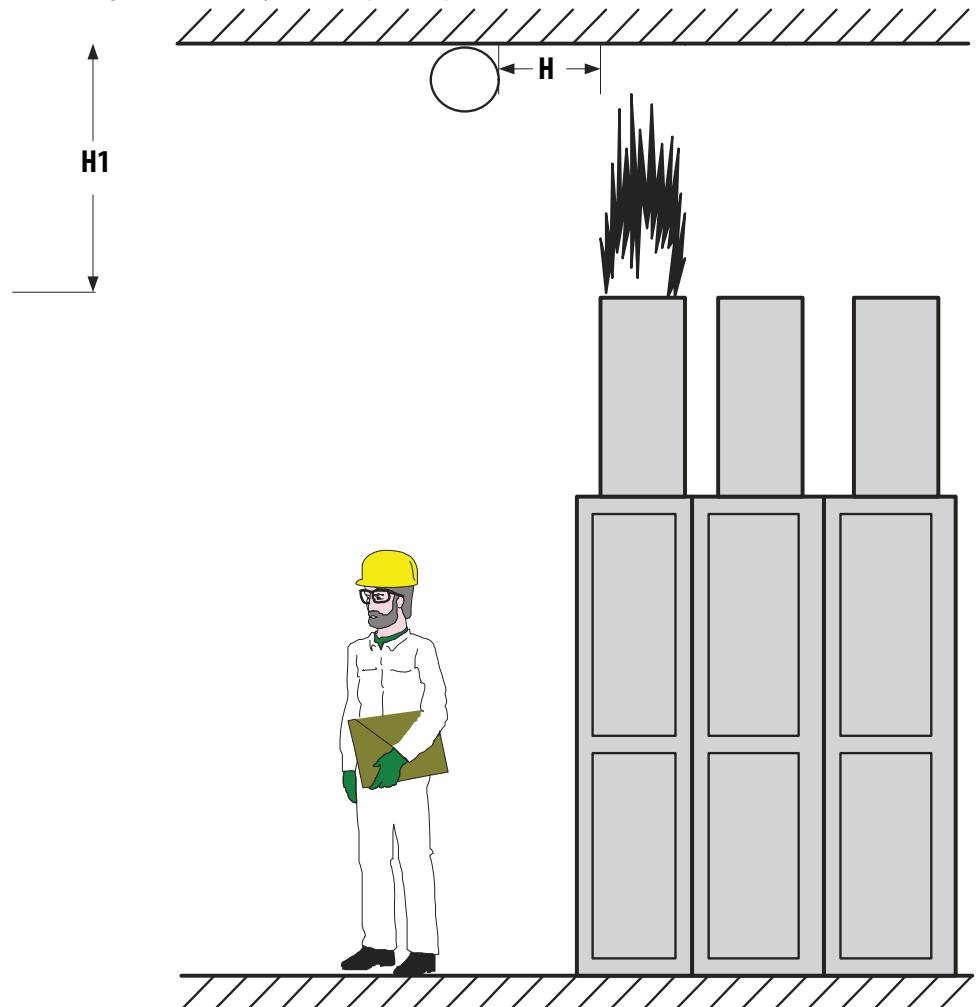
**Figure 59 - Plenum Exit Left with Extensions to Internal Controlled Access Area (Top View)**



**Figure 60 - Plenum Exit Left with Extensions to Internal Controlled Access Area (Front View)**



- Minimum H = 3.5 m (138 in.)
- Minimum L = 1.2 m (47 in.)
- Minimum Volume of space that is required for safe pressure relief:
- $X * Y * H = 11 \text{ m}^3$  (390 cubic feet)

**Figure 61 - Chimney Exhaust Space Requirements**

- Minimum  $H_1$ : 1.7 m (67 in.)
- Minimum  $H$ : 1 m (37 in.)

## Additional Notes

The walls of the plenum exit area must be able to withstand the generated pressure.

Any painted surfaces, which face direct contact with the arc products, can ignite. Flame suppression is recommended.

The exit point can also be outside the building. Make sure that ice, snow, and vermin nests cannot block the exit area.

Access barriers are recommended to restrict access by personnel while the equipment is energized. A chain link fence is a suitable barrier material.

Equipment that consists of more than four vertical sections that are bolted together can require additional plenum exits. Rockwell Automation® provides guidance on requirements for additional plenum exits when required.

## Chimney Information

Where adequate clean height (space) is available, a chimney can be provided for each unit in place of the plenum system. It can be field-mounted on top of the unit structure. The chimney directs the hazardous flames and gases away from the top of the resistant enclosure. The chimney is secured to the top of each unit structure. See [Appendix C](#) for chimney installation instructions.

Each ArcShield line-up includes a chimney exhaust section that extends vertically directly above the enclosure.

## Chimney Exhaust Considerations

1. From the outlet of the chimney, the minimum clear distance is 1.7 m from the top of the chimney to the ceiling, and 1 m (39 in.) on each side.
2. No obstructions, for example Piping, can be in path of the exhaust within the 1.7 m (67 in.) height requirement.

Plan the location where the chimney exhausts. Make sure that:

- There is no access to personnel while equipment is energized.
- Area is free of flammable material or vapors.
- Make sure that adequate space is provided around the chimney exhaust as outlined in [Figure 61](#).

## ArcShield™ Plenum Installation Instructions

The following instructions are provided to help ensure the proper installation and function of plenum components that are supplied with ArcShield™ enclosures. See [Appendix A](#) for additional information that is related to ArcShield™ plenums before attempting to follow these instructions.

### **Recommended Torque Values**

0.25-20 Thread Fasteners – 7.5 N•m (6 lb•ft)  
0.3125-18 Thread Fasteners – 14 N•m (11 lb•ft)

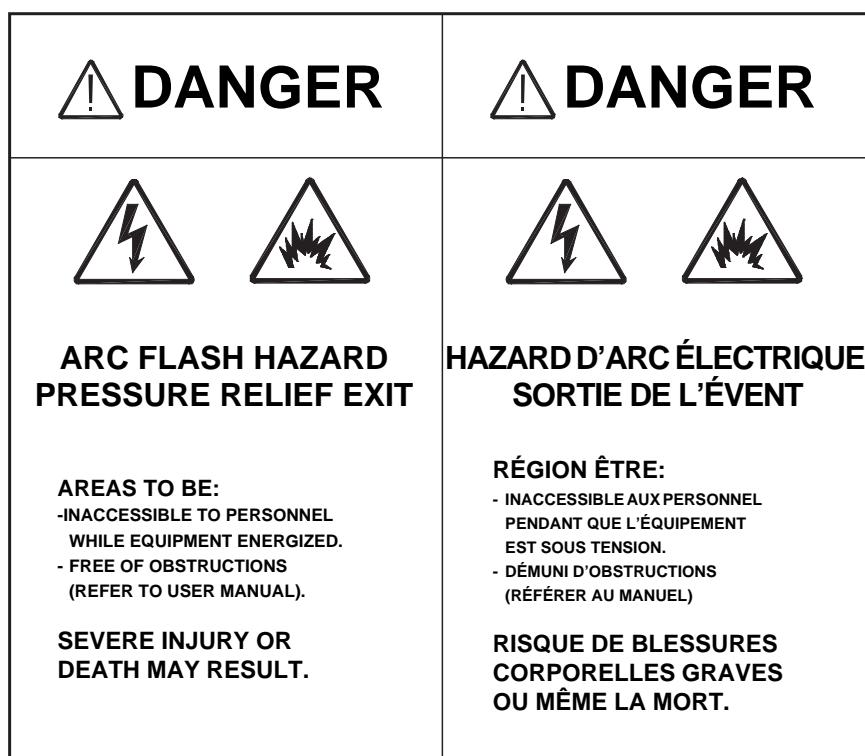
### **Plenum Bracing**

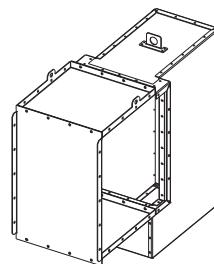
The Bracing of the plenum must be able to withstand the dynamic forces of the arc fault and any other vibration or seismic effects that are associated with the installation. Most of this force is in the direction opposite to where the relief vent exits. The amount of bracing depends on how the plenum is supported at its exit and the distance from the end of the cabinets to the exit vent.

- A flange is available to install hangers for supporting the weight of the plenum.
- The plenum extension has holes for mechanical support.
- Weight per unit length of Rockwell supplied plenum = 28 kg/m (19 lb•ft).
- The installer is responsible for making sure that the plenum extension has sufficient support to resist the effect of vibrations and seismic effects.

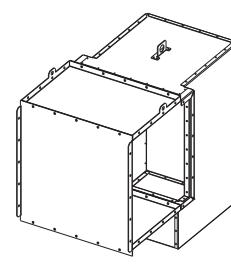
**IMPORTANT** Plan the location where the plenum exhausts (refer to [Appendix A](#)). Equipment in the area of the plenum exhaust can be damaged or destroyed. Mark the plenum exhaust area as a Hazardous Zone, and labeled per [Figure 62](#).

**Figure 62 - Plenum Exhaust Label**

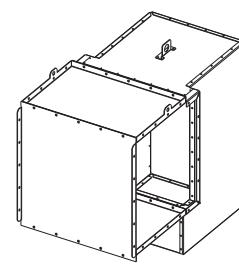


**Figure 63 - Various Plenum Components Available**

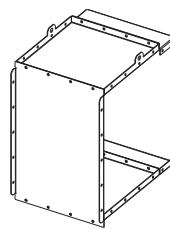
**18 in. wide Plenum**  
Fastened directly over the 0.5 m (18 in.) wide cabinet



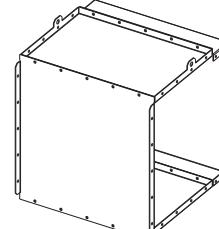
**26 in. wide Plenum**  
Fastened directly over the 0.7 m (26 in.) wide cabinet



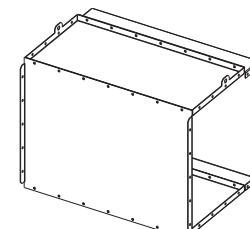
**36 in. wide Plenum**  
Fastened directly over the 0.9 m (36 in.) wide cabinet



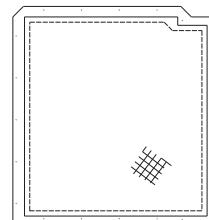
**18 in. long Extension**  
Connected to the last Plenum on the exhaust end of the "line-up"



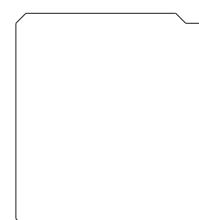
**26 in. long Extension**  
Connected to the last Plenum on the exhaust end of the "line-up"



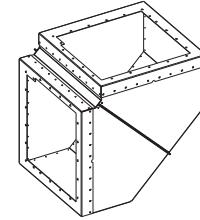
**36 in. long Extension**  
Connected to the last Plenum on the exhaust end of the "line-up"



**Screen Cover Plate**  
Fastened at the opening of the last component on the exhaust end



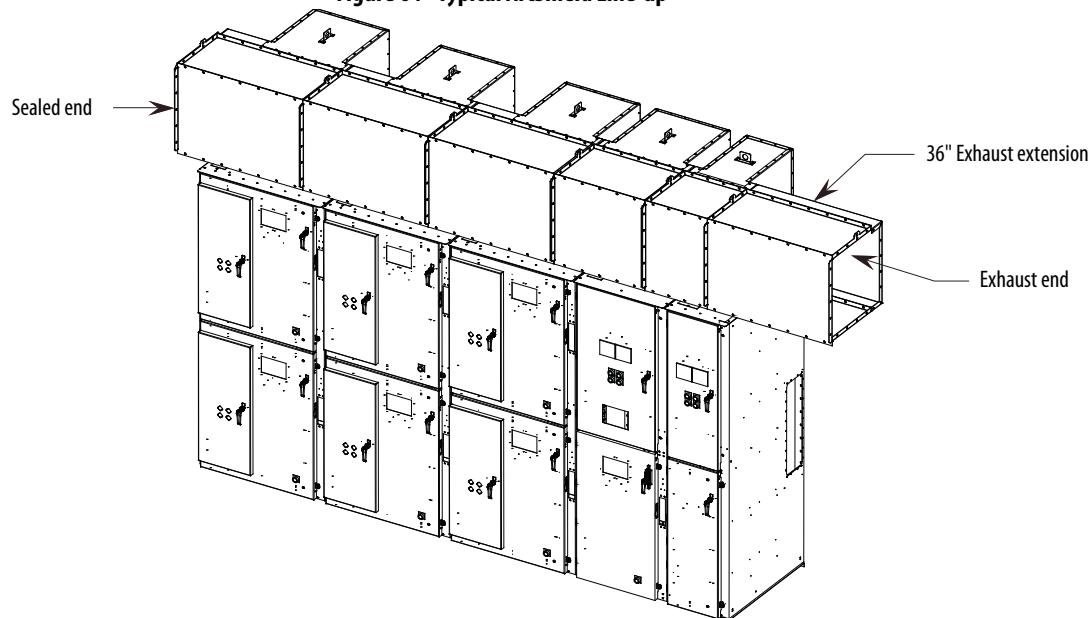
**End Cover Plate**  
Fastened at the opening of the last Plenum in the "line-up" opposite the exhaust end to seal Plenum end



**90° Elbow Section**  
Connected at the exhaust end of the Plenum (or Extension)

## General Plenum Layout for ArcShield Line-up

An example of a general Plenum assembly configuration is shown in [Figure 64](#). Plenums of various widths are mounted directly over the MV enclosures of the corresponding width. A 0.9 m (36 in.) Exhaust extension assembly is shown mounted on the extreme right side Plenum of the equipment "Line-up" (can alternatively exhaust to the left. Engineered systems can be made site specific).

**Figure 64 - Typical ArcShield Line-up**

Plenum exhaust can be on the left or right-hand end of the line-up. Pictures and figures in this procedure are shown for a right-hand exhaust exit direction. Also shown is an optional vertical (top) direction exhaust extension (see [Figure](#)).

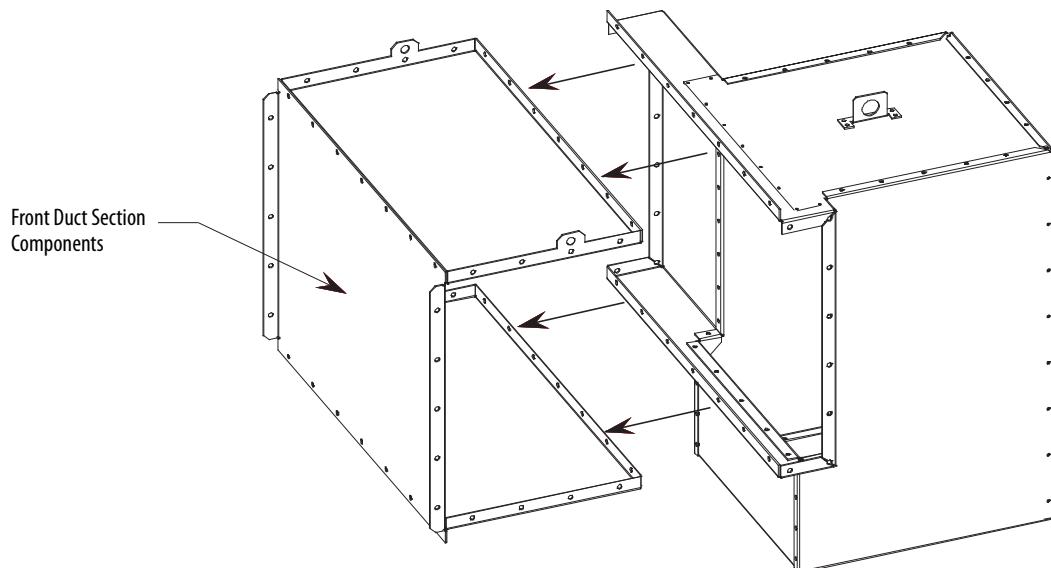
---

**IMPORTANT** Plenum components that are not directly mounted to the tops of the MV enclosures, must have additional mounting support. This requirement includes the Extension components and 90° Elbow Sections (refer to [STEP 7 – Additional Mounting Support on page 79](#)).

---

## STEP 1 – Mounting a Single Plenum

Before mounting a Plenum over an MV enclosure, the front duct section must first be removed, see [Figure 65](#).

**Figure 65 - Removing Front Duct Section**

## Cabinet Preparation

In preparation to mount the Plenum:

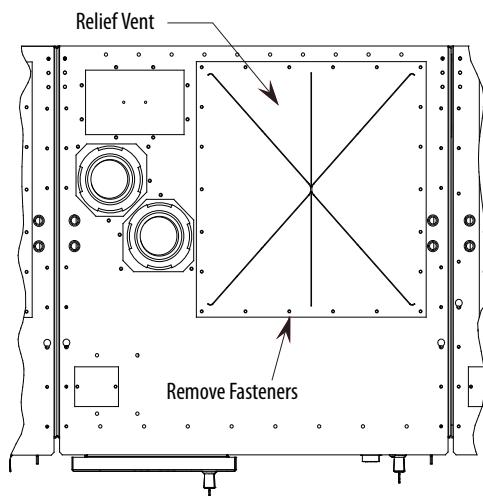
1. Remove the cabinet lifting means (slips of lifting angles).
2. Reinstall the bolts retaining the lifting means in the holes from where they came. Failure to install the bolts negates the cabinets ability to control any arc gases properly.
3. After the lifting angles or clips are removed, remove 0.25-20 fasteners from the Relief vent on the top of the MV enclosure. Leave the (4) corner fasteners in place (see [Figure 67](#)).



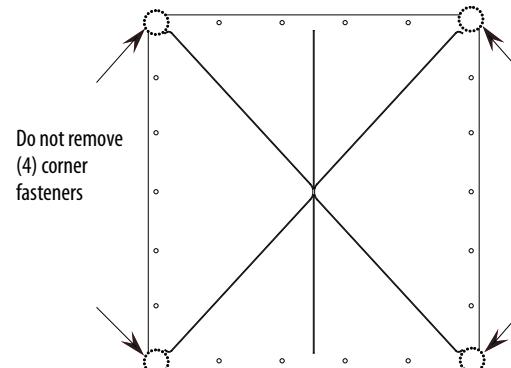
**ATTENTION:** Hardware that is used to retain the lifting provision hardware must be reinstalled in the same holes. Failure to reinstall this hardware makes the arc resistance of the cabinet ineffective and could subject personnel to the possibility of severe burns, injury, or death.

**IMPORTANT** Do not remove the four corner fasteners ([Figure 67](#)).

**Figure 66 - Typical Relief Vent Fasteners (top view)**



**Figure 67 - Relief Vent**



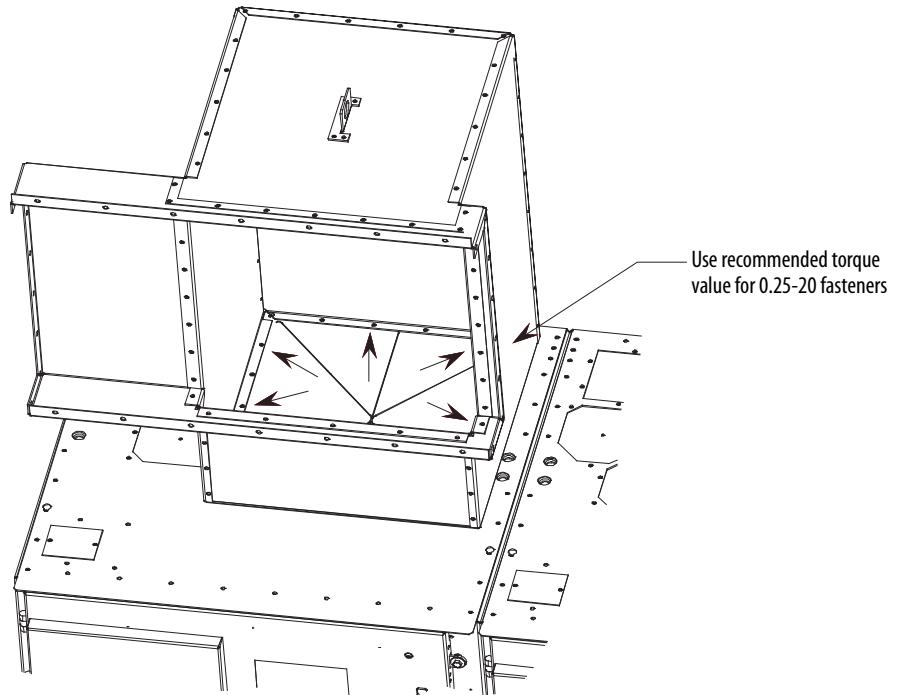
The Plenums are designed to fit over the fastener heads at the corners of the Relief vent. The corner fasteners are required to secure the Relief vent during installation.

## Plenum Placement on Structure

After lifting the Plenum in to place, directly over the relief vent (see [Figure 68](#)):

Reinstall all 0.25-20 fasteners, which were removed in [Cabinet Preparation](#) and attach the Plenum to the top of the enclosure. Use hand tools only.

**Figure 68 - Plenum Placement**

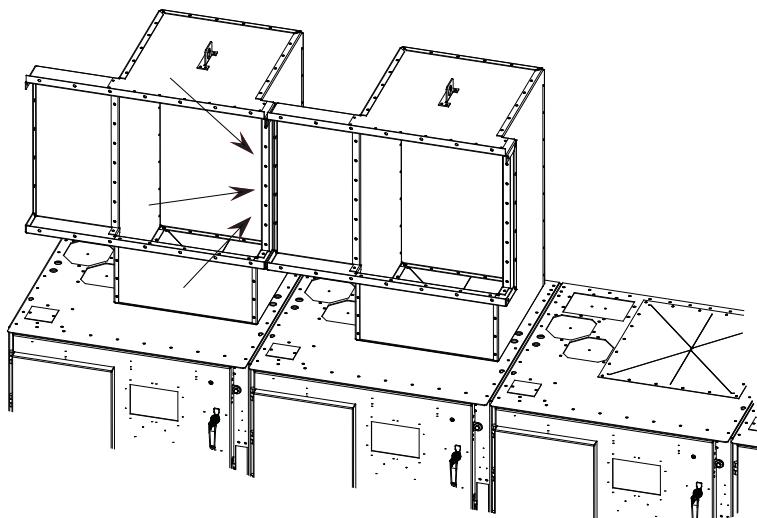


**TIP**

Use silicone caulking generously to fill any air gaps when the Plenum is securely mounted in place.

## STEP 2 – Alignment of “Side-by-Side” Plenums

Plenums that are mounted side-by-side must be fastened together through the aligning holes using 0.3125-in. supplied hardware (see [Figure 69](#)).

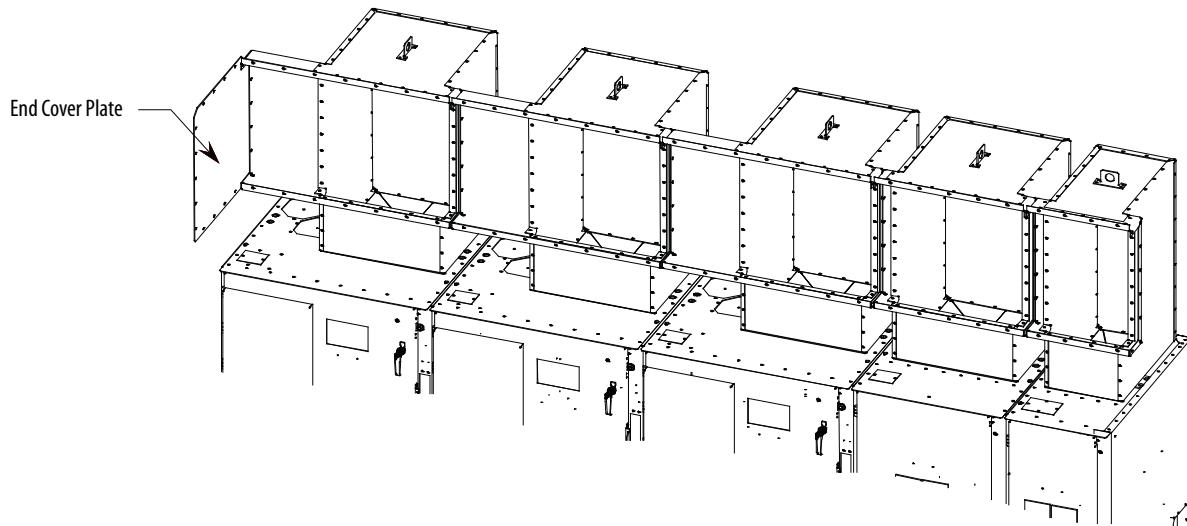
**Figure 69 - Aligning "Side-by-Side" Plenums**

**IMPORTANT** Any unused holes must be filled with thread forming screws. For example  
“Lifting Lug holes”.  
All Gaps must be sealed and filled with silicone.

---

## STEP 3 – Sequence of Final Assembly

All Plenums in a Line-up must be mounted to the top of each enclosure and to the Plenum directly beside it before the front duct sections are reattached (see [Figure 65](#)).

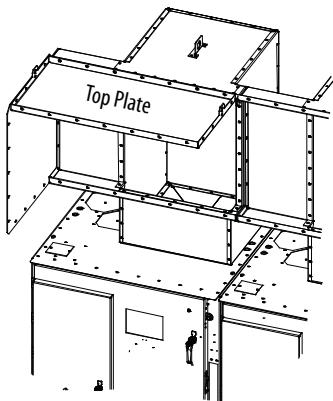
**Figure 70 - Sequence of Final Assembly**

The “End Cover Plate” must be mounted on the closed end of the Line-up using 0.3125-in. hardware (see [Figure 70](#)).

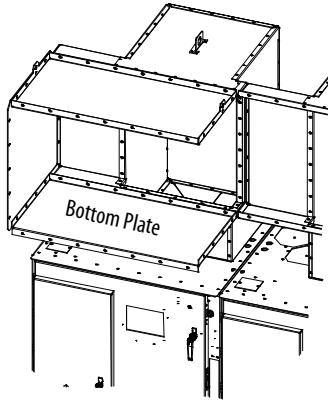
## STEP 4 – Closing the Front of the Plenum Sections

After the first stage of the Plenum assemblies are mounted, the Plenums can then be “closed-up”. Install the front duct sections as shown in [Figure 71](#) to [Figure 73](#).

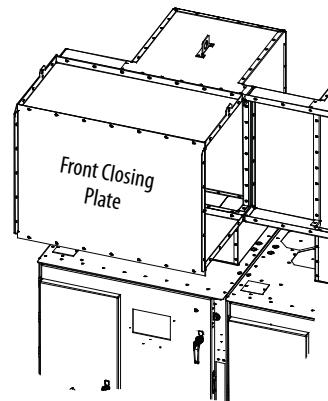
**Figure 71 - Top Plate**



**Figure 72 - Bottom Plate**



**Figure 73 - Front Closing Plate**



**IMPORTANT** Do not reinstall the front duct section of the last Plenum on the exhaust side of the Line-up. See [STEP 6 – Mounting Extension/Elbow to Plenum “Line-up” on page 77](#) for more information).

**TIP**

Use silicone caulking generously to fill any air gaps when the Plenum is securely mounted in place.

## STEP 5 – Extension and Elbow Assembly

Attach the 36 in. Extension components and 90° Elbow Section using 0.3125-in. hardware in the following sequence:

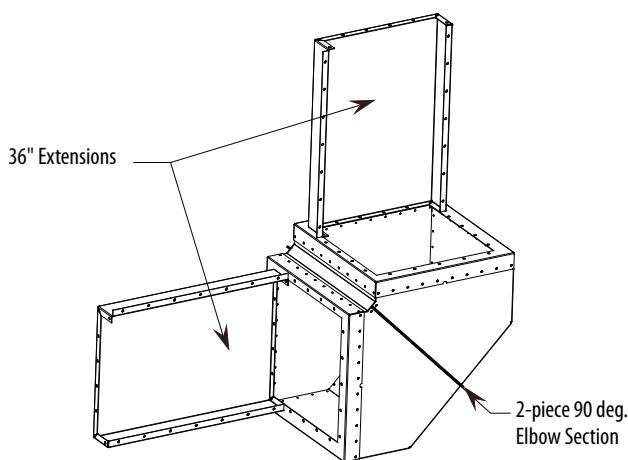
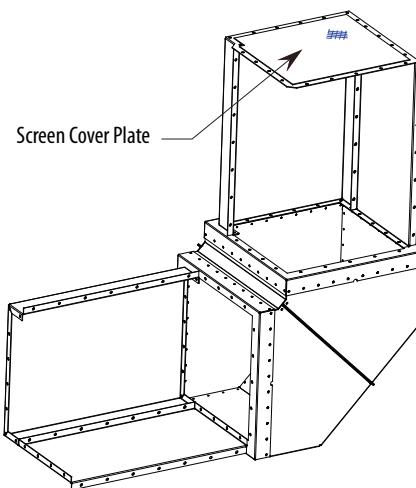
Step 5A – See [Figure 74](#)

Step 5B – See [Figure 75](#)

Step 5C – See [Figure 76](#)

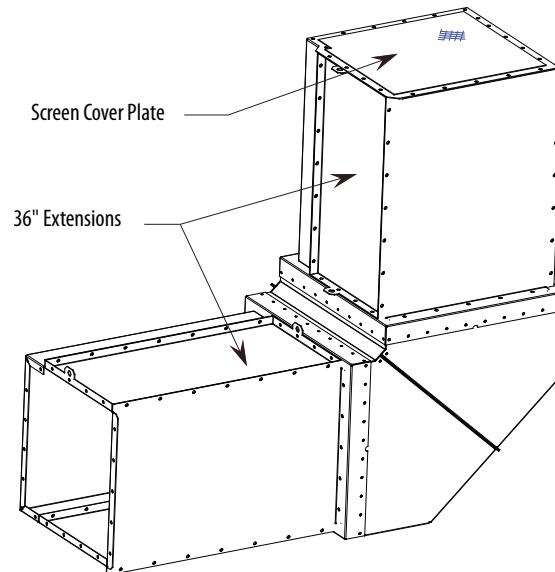
**TIP**

The Screen Cover Plate is attached in [Figure 75](#).

**Figure 74 - 90° Elbow Section Assembly, Step 5A (Front View)****Figure 75 - 90° Elbow Section Assembly, Step 5B (Front View)****Figure 76 - 90° Elbow Section Assembly, Step 5C (Front View)**

The Extension components are attached to the Elbow Section using 0.3125-in. Hardware.

[Figure 76](#) illustrates what the Extension/Elbow Assembly should resemble when finished.

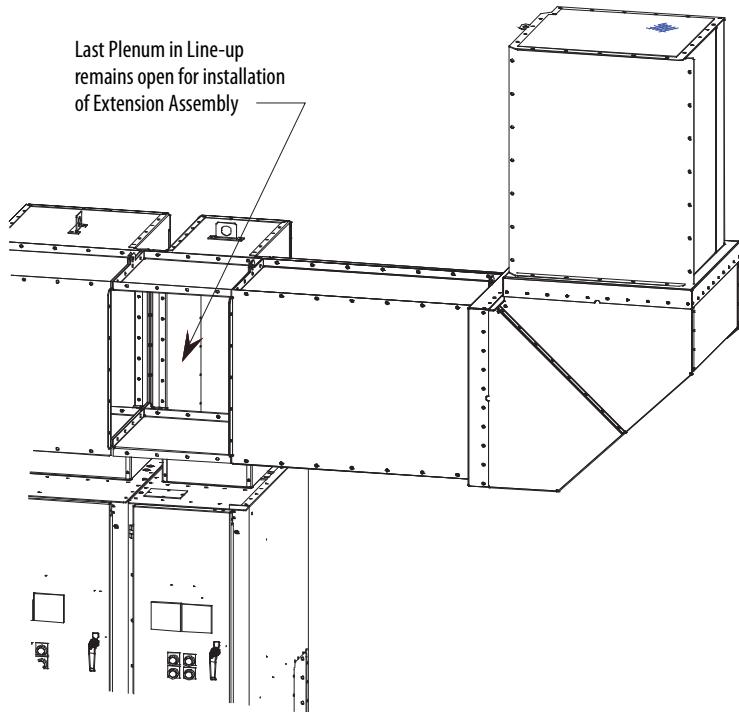
**TIP**

Use silicone caulking generously to fill any air gaps when the Plenum is securely mounted in place.

## STEP 6 – Mounting Extension/Elbow to Plenum “Line-up”

In [STEP 4 – Closing the Front of the Plenum Sections on page 76](#), the last Plenum at the exhaust side of the line-up has the front duct section removed. The absence of the section allows access to fastener holes to mount the Extension/Elbow components (see [Figure 77](#)).

**Figure 77 - Optional Extension/Elbow with Vertical Extension (Right side exit)**



Attach the Extension/Elbow assembly through the fastener holes on the inside flange of the Plenum. Install the front duct section and fasten it through the holes on the outside flanges.

## STEP 7 – Additional Mounting Support

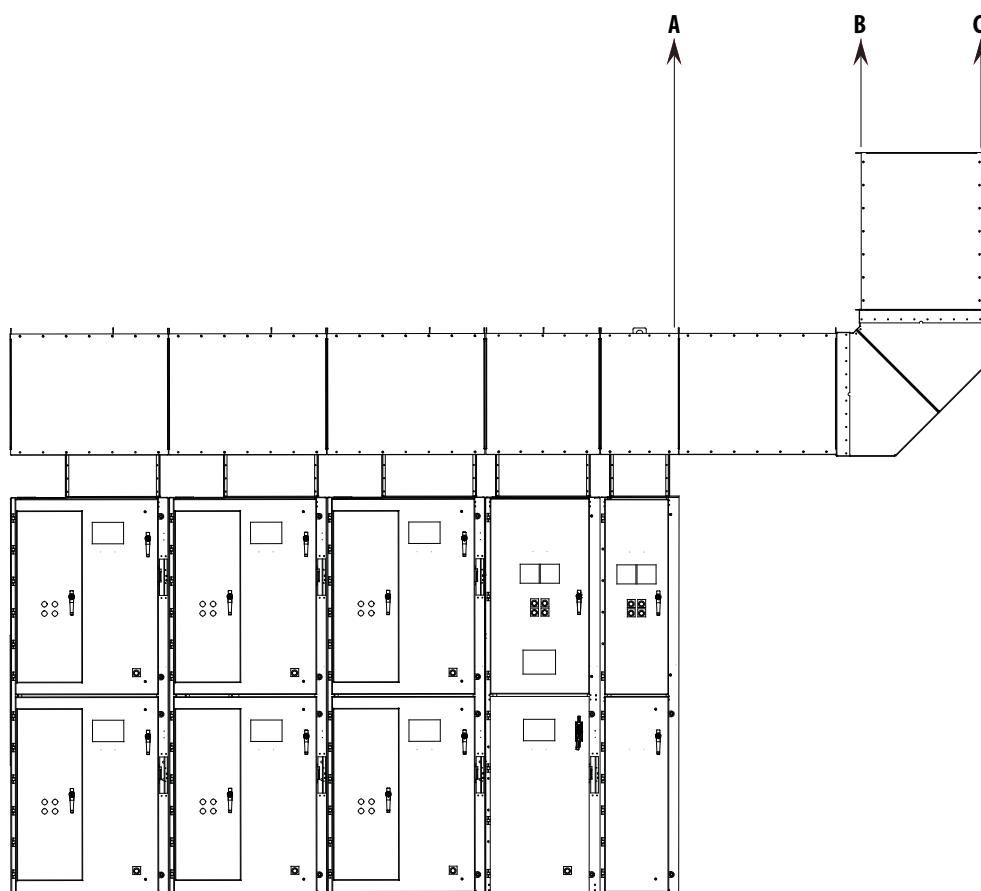
The Extension/Elbow Assembly must have additional mounting support.

**90° Elbow Section:** Approximate weight 64 kg (142 lb)

**36 in. Extension Assembly:** Approximate weight 51 kg (112 lb)

[Figure](#) shows an example of how the Extension/Elbow Sections are supported by suspension from a high ceiling. Points A, B, and C show where chains or high tension cables can be connected.

**Completed Assembly for optional vertical exit Plenum (Right-hand exit)**



**TIP**

During an arc fault, the plenum is subjected to a brief high-pressure shock wave. The Extension/Elbow assembly can experience dynamic loading. It is important to account for dynamic loading when selecting the means of support and materials.

**Notes:**

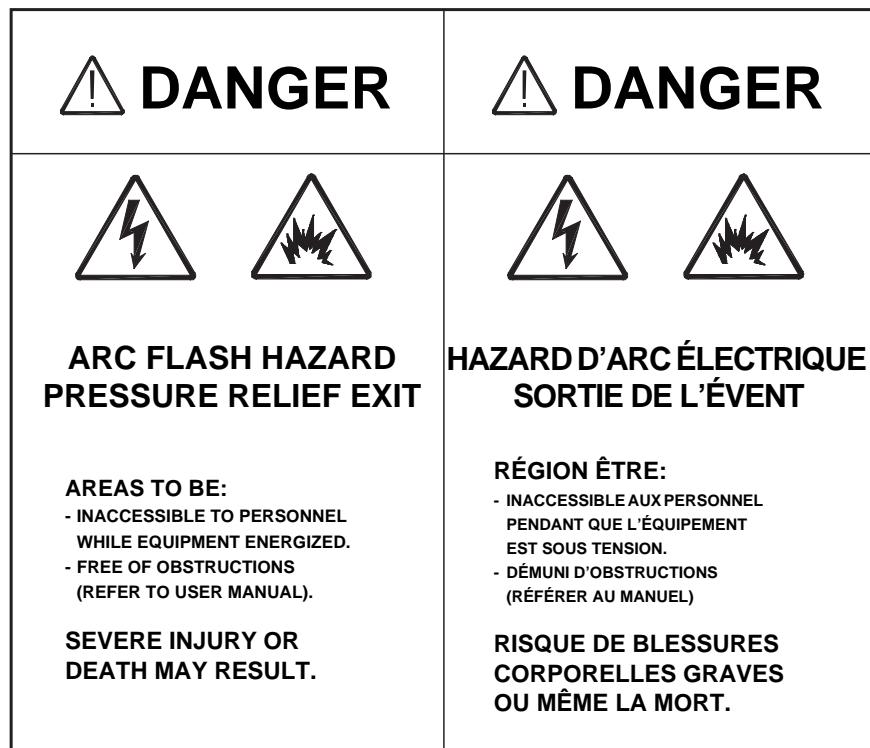
## ArcShield™ Chimney Installation Instructions

These instructions are provided to help ensure the proper installation and function of chimney that is supplied with ArcShield™ enclosures. See [Appendix A](#) for additional information that is related to ArcShield™ chimney before attempting to follow these instructions.

### Recommended Torque Values

0.25 -20 Thread Fasteners – 7.5 N•m (6 lb•ft)  
0.3125 -18 Thread Fasteners – 14 N•m (11 lb•ft)

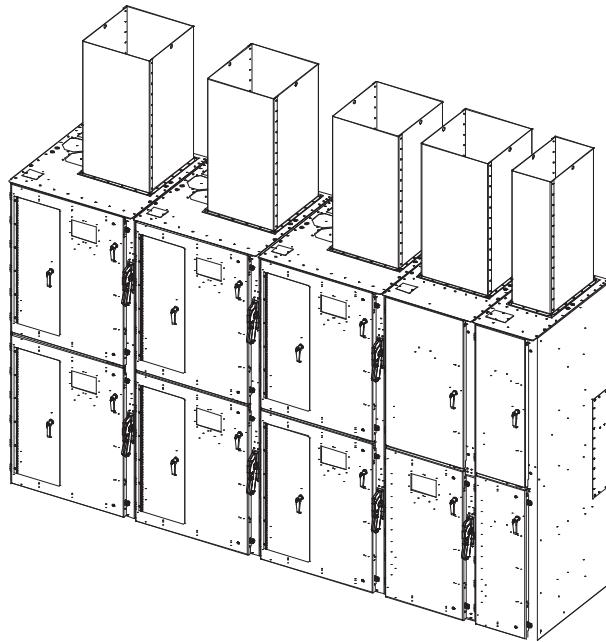
**Figure 78 - Chimney Exhaust Label**



### General Plenum Layout for ArcShield Line-up

An example of a general chimney assembly configuration is shown in [Figure 79](#). Chimneys of various widths are mounted directly over the MV enclosures of the corresponding width.

**Figure 79 - Typical ArcShield Line-up with Chimney Options**



## Cabinet Preparation

In preparation for mounting a chimney:

1. Remove the cabinet lifting means (slips of lifting angles).
2. Reinstall the bolts retaining the lifting means in the holes from where they came. Failure to reinstall the bolts negates the cabinet's ability to control any arc gases properly.
3. After the lifting angles or clips are removed, remove 0.25-20 fasteners from the Relief vent on the top of the MV enclosure..

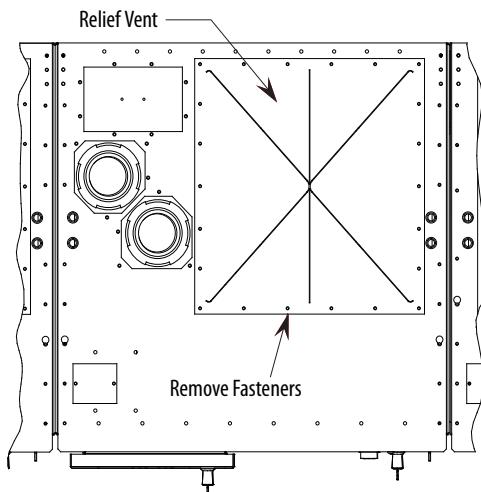
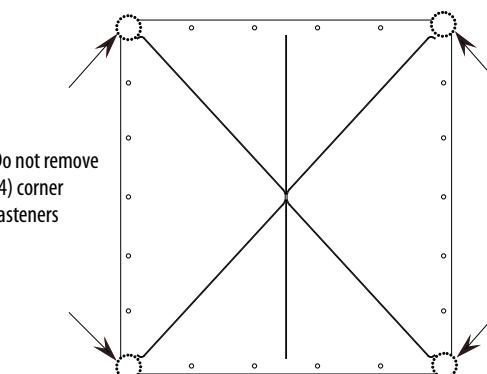


**ATTENTION:** Hardware that is used to retain the lifting provision hardware must be reinstalled in the same holes. Failure to reinstall this hardware makes the arc resistance of the cabinet ineffective and could subject personnel to the possibility of severe burns, injury, or death.

---

**IMPORTANT** Do not remove the four corner fasteners ([Figure 81](#))

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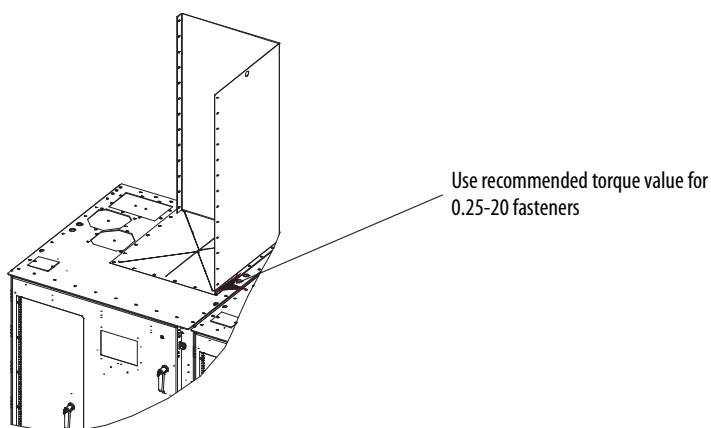
**Figure 80 - Relief Vent Fasteners (top view)****Figure 81 - Relief Vent**

The chimneys are designed to fit over the fastener heads at the (4) corners of the Relief vent. The corner fasteners are required to secure the Relief vent during installation.

### Chimney Placement on Structure

After lifting the Chimney in place, directly over the relief vent (see [Figure 81](#)):

Reinstall all 0.25-20 fasteners, which were removed in [Cabinet Preparation on page 82](#) and attach the Chimney to the top of the enclosure.

**Figure 82 - Chimney Placement**
**TIP**

Use silicone caulking generously to fill any air gaps when the chimney is securely mounted in place.

**Notes:**



## **Rockwell Automation Support**

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

## **Installation Assistance**

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

|                                 |  |
|---------------------------------|--|
| United States or Canada         | 1.440.646.3434   |
| Outside United States or Canada | Use the <a href="#">Worldwide Locator</a> at <a href="http://www.rockwellautomation.com/rockwellautomation/support/overview.page">http://www.rockwellautomation.com/rockwellautomation/support/overview.page</a> , or contact your local Rockwell Automation representative. |

## **New Product Satisfaction Return**

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

|                       |   |
|-----------------------|---|
| United States         | Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for the return procedure.  |

## **Documentation Feedback**

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

**[www.rockwellautomation.com](http://www.rockwellautomation.com)**

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